Nataša
LALIĆ-VUČETIĆ

Biljana
BODROŠKI SPARIOSU

Zvonimir
KOMAR

FROM REVIEWS

The monograph covers a series of relevant topics in the study of motivation in education and points out current challenges and new lines of research. The monograph Motivation in Education: Challenges and Different Perspectives in Research, which synthesizes different empirical and theoretical perspectives on the motivational construct and poses interesting challenges in this field of research and education, is timely in the current scenario. The compilation of works that have been achieved is of high quality and the book is of interest for research and intervention in educational motivation.

Professor Susana RODRÍGUEZ MARTÍNEZ, Psychology Department, Faculty of Education, University of A Coruña, Spain

The thirteen chapters, which are diverse in terms of their theoretical background, national context, type of contribution (review vs. empirical contributions), the specific focus of the contribution, and the educational level addressed, present a synthetic and comprehensive overview of contemporary challenges and findings in the field of research on motivation. The monograph aims to inspire educational experts to renew their pedagogical interest in motivation problems. It provides a clear and comprehensive overview of the relevant aspects, approaches, and empirical findings related to motivation in education. I believe that this monograph will be a valuable source of information and inspiration for further progress in both teaching practice and research.

Professor Katja KOŠIR, Department of Psychology, Faculty of Arts, University of Maribor, Slovenia

I believe that the authors have successfully dealt with all sections as a coherent whole. Motivation studies for different education levels (primary, secondary, and higher education) are also included in the book and can be considered an indicator of its systematic structure. When the book is evaluated as a whole in the context of the chapters written, it has a structure that will certainly contribute to the literature. All authors have contributed to the book with their qualified work and have supported the emergence of a valuable product. Bringing together chapter writers from different countries and with different perspectives, aiming to discuss critical issues in research on motivation, has enriched the book. As a last word, I can say that this book will provide perspective to researchers and education professionals.

Professor Şengül S. ANAGÜN, Department of Elementary Education, Faculty of Education, Eskişehir Osmangazi University, Turkey

MOTIVATION IN EDUCATION: challenges and different perspectives in research

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Editors
Nataša LALIĆ-VUČETIĆ
Biljana BODROŠKI SPARIOSU
Zvonimir KOMAR

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CHALLENGES AND DIFFERENT PERSPECTIVES IN RESEARCH

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FACULTY OF HUMANITIES AND SOCIAL SCIENCES,
UNIVERSITY OF ZAGREB, CROATIA

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2023.

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FOREWORD

The conceptual focus of this thematic collection of papers is motivation in education, defined most broadly. The complexity of this issue can be illustrated by three aspects. Certainly, the first aspect concerns the existence of a multitude of psychological theories contending to explain human motivation, including its manifestation in the context of education. The second aspect pertains to the very concept of education, which is not only ambiguous but has been extensively reexamined in pedagogical theories in recent years. The third aspect relates to the increasing shift away from the strict disciplinary approach to science. Interdisciplinary and multidisciplinary approaches to certain fields of research are ubiquitous in modern scientific literature.

All interested parties in the education system have voiced concerns about students' lack of motivation to continue their schooling after completing compulsory education and a decline in intrinsic motivation at higher education levels. Much more specific concerns include secondary school students being only marginally intrinsically motivated in science and mathematics; primary school students infrequently listing math as one of their favorite subjects; students' parents having math anxiety, which diminishes the benefits of home support in their children's learning; and students often stating that they are bored in class. These are some of the numerous and serious challenges faced by practitioners, researchers, and education policymakers alike.

The understanding of motivation in education has been immensely enhanced by education research based on major psychological theories of motivation, including Self-Determination Theory, Attribution to Failure Theory, Expectancy Value Theory, Achievement Goal Orientation Theory, and Self-Efficacy Theory. Some of these theories have inspired the exploration of motivational constructs within large-scale international comparative research on students' educational achievement, such as the OECD`s Programme for International Student Assessment (PISA) and certain cycles of Trends in International Mathematics and Science Study (TIMSS), organized by the International Association for the Evaluation of Educational Achievement.

Different psychological theories of motivation conceptually and methodologically guide research efforts aimed at understanding education and educational achievement and the same is true for various theories of education. In this sense, what is paramount for education research includes not only psychological aspects but also aspects of education philosophy, upon which general pedagogy relies in its consideration of key pedagogical concepts and theories. The pedagogical tradition of continental Europe has long fostered more nuanced relationships between certain pedagogical notions and processes in comparison to the more narrow understanding of the concept of education as formal education in the English-speaking world. In this context, language is crucial. Much thought needs to be put into translating certain key terms in major pedagogical theories. For instance, the German concepts of *Erziehung* and *Bildung* represent distinct educational paradigms, which are often obscured by translating them both as *education*. Thus, future research on motivation in education should certainly dedicate greater attention to different conceptualizations of education.

As a perennial issue in education systems around the world, motivation in education is often seen as a key to solving large-scale social problems, such as economic growth and social cohesion. In many global and regional reform initiatives, schooling and education systems as a whole are viewed from the standpoint of economic logic and political goals, which can greatly diverge from authentic educational values. The increasing "pedagogization of society", according to which root causes for different social problems lie in the inadequate education of children and youth, have put educational actors (individuals and institutions) in the unfair position of being held responsible for issues that run much deeper in society. Education systems, like all others, have their own autonomous goals and boundaries in relation to other systems. Thus, one of the burning topics in the field is the reexamination of the existing relationship between the school and society in contemporary education policies. In contrast to the unidirectional expectation from schools to prepare students for the ever-changing demands of the contemporary economy of knowledge and social participation, nowadays, expectations have also begun to flow in the opposite direction. This brings us to the increasingly common question posed by educators that begs contemplation and was eloquently formulated by Prof. Biesta: "...what society should 'do' for the school so that the school can be school…" (Biesta, G., 2022. *World-Centred Education*, New York and London: Taylor & Francis, p. 9).

THEMATIC AREAS, APPROACHES, AND CONTRIBUTIONS

With the strong belief that freedom of choice and pursuit of personal research interests yield the best results, we invited esteemed authors to contribute to this volume. There were no limitations in terms of the thematic focus, disciplinary orientation, or methodological approach. It is our position that diversity in approaches and perspectives is uniquely beneficial to research on motivation in education. The thirteen papers comprising this volume represent truly motivated responses to the relatively broadly framed topic. In the face of the dilemma of whether the thematic framework should be narrowed for convenience or expanded to encompass all identifiable dimensions of the issue, we chose the latter, more demanding solution, which has its own inherent implications. One of them pertains to organizing the content into a coherent whole.

As researchers and educators, we are interested in various aspects of motivation in education. Thus, the chapters of this book do not merely reflect individual research affinities but can serve as an overview of current research in the field. In the same vein, this volume offers a comprehensive and systematic insight into existing research on motivation at different education levels (primary, secondary, and higher education). Studies on the motivation of different actors are presented and analyzed in the book, including students, teachers, and parents, mostly in the context of formal education. The pedagogical approach to motivation in Marko Palekčić's *Pedagogical approach to motivation in the education system* represents a valuable source of inspiration for pedagogists, enticing them to renew their pedagogical interest in motivation problems. The author highlights the significance of the originally pedagogical theory of education and provides a more thorough analysis of the key pedagogical concepts, using the language and terminology of pedagogy as a science. Zvonimir Komar's *Interest as a principle of activity of the pedagogical subject* strongly advocates the reaffirmation of the pedagogical way of thinking. Interest constitutes a key concept in the pedagogical theory of J. F. Herbart, the founder of pedagogy as a science, and now more than ever, it is crucial for pedagogists to return to their roots. The marginalization of the pedagogical approach in contemporary reform initiatives at all levels of the education system largely stems from a lack of interest in the philosophical legacy and philosophical frame of thinking about education. What happens to education and what pedagogical implications arise when economic agendas take

primacy in education policies is explored in Biljana Bodroški Spariosu's paper entitled *A Conceptualization of motivation in higher education: The European Union educational policy*.

Psychological theories and psychological research on motivation in education have continuously and consistently made a major contribution to the understanding of education actors' motivational patterns and interpersonal relations as the context within which education takes place. Research on motivation in education represents a link between theory and educational practice and can contribute to the development of motivation theories and improve the quality of motivation of all participants in the educational process. Bo Zhu and Helen Patrick's paper entitled *Challenges for research on teacher motivation and emotion* provides a review of the relevant literature and empirical research in the field and identifies a significant improvement in knowledge about teacher motivation and emotion. They further note that future research should focus on questions regarding variability and change in teachers' motivation and emotion and the personal, subjective nature of these constructs. Parents are major stakeholders in every education system, which lends particular significance to Eleftheria N. Gonida's paper entitled *Parent motivational beliefs, student motivation, and learning outcomes: theory, evidence, and implication for practice*. The family context interacts with the school context, as both constitute main settings in which children live and operate. Furthermore, contemporary approaches suggest researching motivation in real-life learning environments, which would provide more realistic information about conditions and dynamic characteristics that contribute to student engagement in these contexts. The significance of cooperative learning and peer interactions for student motivation is the central focus of the paper entitled *Student motivation in a cooperative learning context* authored by Slavica Ševkušić. In the chapter *Boredom in the classroom and student motivation*, Ljiljana B. Lazarević provides an overview of studies investigating proneness to boredom, with a special focus on boredom in the school context and its consequences for learning outcomes. The paper entitled *Classroom practice and student motivation* by Nataša Lalić-Vučetić highlights the key variables and guidelines related to improving teaching practice, based on the results of numerous empirical studies that bring to the fore some crucial didactic and methodical principles for developing and nurturing motivation in the school context. Dušanka Lazarević authored the chapter entitled *Research on motivation in education: A systematic review of research in Serbian scientific*

journals in the period of 2000–2020. The author concludes that there is room for further diversification of research problems on fostering motivation in education. Greater theoretical and methodological diversity in research provides a broader basis for an improved understanding of student, teacher, and parent motivation and engagement in dynamic learning contexts.

Many student motivation constructs have been examined in large-scale international research on student achievement, relying on major psychological theories of motivation. A highly systematic and analytical overview of relevant research is presented in the paper authored by Jihyun Lee and Lazar Stankov entitled *A review of motivational and closely related constructs in PISA 2000 to 2018*. To improve future research on motivation using PISA data, existing motivational constructs should be more extensively featured.

A particularly significant contribution to the understanding of motivation in education is provided in three chapters featuring results of empirical research. Florian H. Müller is the author of the chapter entitled *Motivation in Science and Mathematics Education: A person-oriented approach*. The study was based on Self-Determination Theory and examined Austrian secondary school students from STEM classes (the sample comprised 1.321 students). One of the goals of the study was to identify motivational types that empirically differ in the quality and quantity of motivational regulation in STEM instruction. Another goal was to determine differences between types in terms of the perceived learning environment, process, outcome variables, and gender. Jelena Radišić and Francisco Peixoto authored the chapter entitled *Motivational mathematics profiles of primary school children: How do they really feel about math*? Adopting a person-centered approach and drawing on the expectancy-value theory, namely, expectancies of success and task values, this chapter investigates different aspects of primary school students' motivation in mathematics. The sample included 1.115 primary students from Norway, Portugal, and Serbia. Katre Kikkas, Äli Leijen, and Krista Uibu report the results of their research in the chapter entitled *Characteristics of the home learning environment related to students' motivation to learn mathematics in grades 3-5*. The paper provides an assessment of Estonian students' motivation to learn mathematics in primary school and identifies possible relations between students' motivation to learn mathematics and parents' at-home practices supporting this process. Background data and assessments of mathematics

motivation were collected from 464 students and 536 parents in Estonia through questionnaire surveys.

EDITORS' REMARKS

The papers collected in the book *Motivation in education: Challenges and different perspectives in research*, all written in the past two years, constitute an attempt to emphasize the significance of researching motivation in different educational contexts. The selection of these thirteen chapters was based on the desire to present a more comprehensive framework that would allow for the understanding of different individual perspectives in research on motivation in education. In spite of a certain degree of thematic dispersion, primarily stemming from authors' personal choices and professional preferences, the papers aim to encourage the resurgence of and reflection on critical issues in research on motivation and education (education philosophy – the dominant perspective on the nature of motivation in pedagogy; the conceptualization of motivation in higher education, motivation in mathematics and science in different countries; the motivational constructs of PISA and STEM education; the link between motivation and emotion and strategies for connecting these areas; parents' beliefs and student motivation; the learning environment and parental support; the contextualization of teacher motivation; teacher motivation and the development of the teaching profession; on motivation and boredom in class; different school practices and motivation; analyzing and reviewing published papers on motivation in journals; and more). Sharing their research results and thoughts on motivation and offering different insights and analyses, the authors showed immense dedication to this endeavor. They demonstrated their professional work in action and showcased it to actors in education as proof that it can be likened to a *case study* process aimed to encourage collaboration and active reflection.

We hope that this book will prove inspiring to students, professionals, and researchers of different persuasions. For editors of this publication, work on this volume was marked by open and personable communication with all authors. We consider it a great honor that researchers from nine countries (Australia, Austria, Estonia, Greece, Croatia, Norway, Portugal, Serbia, and the United States of America) accepted our invitation to contribute and supported this publication.

Their ongoing responsibilities at universities and scientific institutes did not prevent them from showing readiness and motivation to be a part of our author community. In a world riddled with crises, good intentions, collegiality, and mutual respect are more precious than ever. If it is true that collaboration best allows people to get to know one another, we can say that this task brought us the greatest satisfaction – a confirmation of *amor sciendi*.

At the end of this preface, we would like to thank our esteemed colleagues, Marko Palekčić and Eleftheria N. Gonida, for their support, inspiration, and friendly conversations, as well as our dear collaborators and esteemed colleagues, Florian H, Müller and Helen Patrick, for their thought-provoking questions and constructive suggestions. We further thank Ljiljana, Jelena, Peixoto, Jihyun, Lazar, Ali, Katre, Krista, Bo, Dušanka, and Slavica for their cooperation and perseverance during the process of transforming the initial idea into this volume. We express our profound gratitude to our reviewers, Prof. Şengül Anagün, the Osmangazi University, Turkey, Prof. Susana Rodríguez, University of Coruna, Spain, and Prof. Katja Košir, the Faculty of Arts, University of Maribor, Slovenia, for their readiness to participate in this project and elevate the quality of this monograph with their suggestions. In hopes that our cooperation forms a stepping stone for future collaboration between various institutions across Europe and beyond, we wholeheartedly thank our co-publishers, the Alpen-Adria University of Klagenfurt, Austria and the Faculty of Humanities and Social Sciences, University of Zagreb, Croatia. We owe our sincere gratitude to the Institute for Educational Research, for its instrumental role in the creation and publication of this monograph.

Editors

Nataša Lalić-Vučetić

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Zvonimir Komar

PEDAGOGICAL APPROACH TO MOTIVATION IN THE EDUCATION SYSTEM

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Abstract. Pedagogical approach to motivation is analysed in the context of relation between the notion/concept of motivation and basic pedagogical notions, two meanings of the notion of education (education as an institutional activity and education as the basic pedagogical notion) and two different institutional conditions within the frame of educational reforms. This article is based on a series of theoretical and empirical studies of motivation (and interests) in various educational stages. It uses meta-analyses of empirical studies of motivation, as well as the so-called reflexive methodology. In this article, the pedagogical approach to motivation is discussed through the following three questions: (1) Is it meaningful and even possible to consider the pedagogical approach to motivation, i.e. are there pedagogical theories of motivation/interests, versus non-pedagogical, especially psychological theories? (2) Is the specific pedagogical empirical approach to motivation possible, versus the psychological approach or the approach of other social sciences and humanities and (3) Is it possible to differentiate between the genuine pedagogical notion of teaching practice (teaching that includes upbringing, but still with education as its main goal, in Croatian, *odgojna nastava koja obrazuje*, in German, *erziehender Unterricht*, *der bildet*), in which a true pedagogical notion of motivation/interests is reflected and can be developed, and parapedagogical concepts? A critical reconsideration of the postulates of (intrinsic) motivation theories is a necessary prerequisite of the pedagogical approach. The conclusion of the article indicates the need for the specific pedagogical approach to motivation, which is already partially developed and/or is currently being further developed.

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Keywords: pedagogical approach to motivation in the educational system, pedagogical perspective, pedagogical theory, pedagogical empirical research, pedagogically created practice.

INTRODUCTION

Until the early 1960s, self-understanding of pedagogy was determined by its spiritual-scientific tradition. However, in the 1960s, pedagogy was transformed from a spiritual-scientific discipline into a social-scientific discipline. This was the beginning of the so-called "realistic turn" in pedagogy, in the sense of a turn towards experientially and scientifically proven methods (Palekčić, 2019). At the same time, as pedagogy searches for its new (theoretical and research) identity, some major educational reforms are taking place, in which pedagogy is trying to find its place as an empirical discipline. In the educational reforms of the 1960s, as well as in all educational reforms up until today, there has been a search for the factors of successful learning, which are seen as the most important criteria of efficiency, that is, the efficiency of certain education systems. Among these factors, motivation occupies a dominant place (see the paper *Fascination with primary motivation*, Neumann, 2007). The meaning of motivation in the social context has not changed to this day, as Ballauff describes succinctly through axioms, postulates, and definitions (according to Ruhloff & Poentisch, 2004, pp. 155–157):

"*1st axiom*: No man says or does anything, that is, he does not act without some motivation.

2nd axiom: Today we live in an achievement-oriented society.

Postulate: If someone in that society needs to achieve something, s/he must feel motivated for it, or s/he must be motivated for it, externally.

1st definition: Motivation describes a superior instance of directing behavior. It should be understood as the individual's current readiness to coordinate and direct his sensory, cognitive and motor functions to reach a future target state.

2nd definition: Within the various forms of motivation, a central place is occupied by the motivation for achievements."

The Anglo-Saxon empirical approach to institutional education (education system seen as field research[1] which involves research of different branches, e.g., psychology, sociology, philosophy, history) has spread to continental Europe, as well. According to this approach, educational research was understood (and still is) as an interdisciplinary field in which there is no place for a pedagogical approach.

The newly built original pedagogical perspective enables a pedagogical (pedagogy as a science) approach to motivation in the education system. Pedagogy was understood as a practical discipline whose scientific foundations consist of knowledge of other disciplines (e.g., psychology). This resulted in negligence in the construction of a pedagogical theoretical perspective, as well as the construction of a specific pedagogical research perspective (Palekčić, 2015, 2019). Pedagogical scientists advocated and still advocate that pedagogy should contribute to research of the educational system, without the need to legitimize and develop a specific pedagogical approach to education. They forget and often need to be reminded that *inter*disciplinarity (Palekčić, 1989b) presupposes a developed discipline. Moreover, in the case of the science of education, this means that the research of motivation in the education system is connected with the construction of a specific pedagogical scientific perspective. The pedagogical approach to motivation in education (Palekčić, 1989a) has not been systematically developed in pedagogy as a science. Therefore, we are trying to contribute to that approach in this work.

The beginning of the systematic empirical research on motivation in the 1960s, which continues to this day, is connected with the need to optimize the teaching process within the framework of educational reforms. Motivation (achievement) has been researched and is being researched today as a condition and means of students' better success. In the 1970s, research into so-called intrinsic motivation began.

In this paper, the pedagogical approach to motivation is considered on three levels: theoretical, empirical-research, and practical (teaching-operational), that is, through the following three questions:

(1) Is it meaningful and even possible to talk about a pedagogical approach to motivation, meaning, are there any pedagogical theories of motivation/interest as opposed to non-pedagogical theories, especially psychological theories?

1 On the problem of translation (Palekčić, 2019, pp. 183–188)

(2) Is a specific pedagogically empirical-research approach to motivation possible, as opposed to the psychological approach, that is, the approach of other social sciences and humanities? and
(3) Is it possible to distinguish the original pedagogical term of teaching practice (educational teaching that educates) from parapedagogical concepts in which the original pedagogical notion of motivation/interest is manifested and can be accomplished?

The work is based on a series of theoretical and empirical studies of motivation and interest at different levels of education (see literature). The paper also uses meta-analyses of empirical research on motivation and interest, as well as the so-called reflexive methodology (Palekčić, 2019, pp. 185–186).

PEDAGOGICAL APPROACH TO MOTIVATION IN THE EDUCATION SYSTEM: (UNDEVELOPED) THEORETICAL APPROACH

The acceptance of other sciences as fundamental for the scientific foundation of pedagogical practice led to an increase in topics and perspectives in pedagogy, but it revealed the lack of theoretical work in pedagogy and thus indirectly slowed down the development of the disciplinary identity of pedagogy.

The recursive relationship of non-pedagogical (sociological, psychological, and other scientific disciplines) theories and terms is also reflected in the view that there is no theoretical pedagogy that could contribute to the interpretation and research of upbringing and education. The consequence of this is also the dominance of "foreign terms" (socialization, learning, motivation, competence, and others). The result of that process has been the suppressed development of a pedagogical approach to motivation in the education system.

For every field of science there are basic or "domestic terms" (*principia domestica*). "Domestic terms" cannot be reduced to the terms of other sciences. Domestic terms of one science that are used in the field of other sciences are called "foreign or blind terms" (Palekčić, 2015, p. 343). There are also terms that belong everywhere (for example, "competence"), and they are called *principia peregrina*.

Every science has its own domestic terms. When one science (e.g., pedagogy) adopts terms of another science (for example, the term motivation from

psychology), then those terms appear as a concept in pedagogy. Concepts do not serve theoretical clarity but provide orientation in professional (pedagogical) work.

Concepts can be labeled as pragmatic constructions for the purpose of professional processing of problems, as guidance for action, and an appropriate degree of necessary reduction of complexity. Concepts are intended to give direction and as many practical solutions as possible (Drischner & Gaus, 2017, pp. 400–402).

Thus, by adopting the terms of other sciences, the understanding of pedagogy as a practical discipline is strengthened, because it uses "foreign" terms, and not its own system of "domestic" terms. Hence, pedagogy should not adopt the terms/concepts of other sciences without questioning them[2].

When establishing pedagogy as an academic discipline and science, its founder, Johann Friedrich Herbart, indicated how to develop pedagogy as a theoretical discipline and how to establish relations between pedagogy and other disciplines. "It would be more beneficial if pedagogy remembered its domestic terms to a greater extent and cultivated more independent thinking, thus becoming the center of the research circle, and would therefore not be exposed to the dangers of being ruled as a distant province from someone else's territory. It is only when each science tries to orient itself in its own way, and with its own strength, as well as its neighbors, can there be a beneficial relationship between them. Philosophy itself should be pleased if others by *thinking* meet it..." (Palekčić, 2015, p. 312)

When pedagogy builds its own terms (according to Herbart, these are management/disciplining, educational teaching, and educational counseling), there is no danger of pedagogy being managed as a distant province (that is, it will not be applied psychology). Another reason for the development of domestic terms and independent thinking, according to Herbart, lies in the fact that only the establishment of an independent science of education makes it possible for the general, that is, cognitive progress of science. Pedagogy, according to Herbart, can best generate knowledge of education if it is not applied psychology, but if it builds its own research circle, that is, if it builds its own original research perspective (Palekčić, 2019).

2 Herbart often pointed out that leniency towards "foreign" opinions was a failing approach, because proponents may not know the matter properly and thus begin to see it as a means for something else (Palekčić, 2015, p. 329).

A specific pedagogical research circle does not mean that pedagogy must renounce the results of other sciences (which are sometimes valuable for pedagogy itself and especially for pedagogical practice), but independent pedagogy evaluates these results according to its own criteria, that is, makes them available for systematic research from a pedagogical perspective and thus makes it impossible for the recognizable pedagogical approach to be "lost or suppressed" by the "hostile takeovers" of other sciences.

Pedagogy should always transform "foreign terms" into "domestic terms", whenever possible. Critical re-examination of the assumptions of theories of (intrinsic) motivation is a necessary assumption for a pedagogical approach to motivation (not only) in the system of education (Palekčić, 1975, 1981, 1985, 1989a, 1990).

We thematized the pedagogical approach to motivation from a (general) pedagogical theoretical perspective (Ballauff, 1962; Benner, 2015; Herbart, 1806; Petzelt, 1964; Prange, 2005; Süenkel, 2011; i.e. Palekčić, 2015) and in the context of motivation in the system of pedagogical terms: (a) Questioning the term motivation in the system of basic pedagogical terms shows that the term *interest* is the pedagogical counterpart of motivation. This is an indication and a characteristic of the (self) education of pupils/students[3]. The subject, relational (interactive), and cognitive character of interests distinguishes them from the characteristics of motivation and motive (as a trait, as a person's condition and as a characteristic of external stimuli); (b) Two meanings of the term education (education as an institutional activity and education as a basic pedagogical term), that is, the distinction between the term education (*Bildung*) and the term training (*Ausbildung*)[4]; (c) Relations of upbringing (*Erziehung*) and education (*Bildung*).

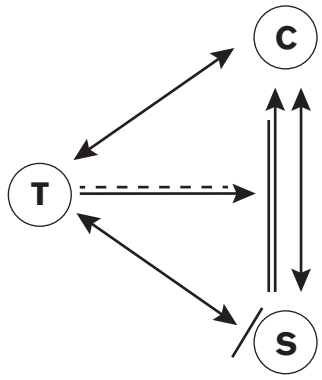
From the pedagogical theoretical perspective, upbringing and (self) education are considered as being both mutually separate and interconnected concepts. At the center of the term "upbringing" (according to Benner, 2018, p. 107) are the actions and activities of natural and professional educators. At the core of the term "education" is the interaction between a person and the world, in which both

3 An analysis of the relationship between interest and education, as well as the interrelationship of other pedagogical concepts (which are according to Herbart, management/disciplining, teaching, and pedagogical counseling), has yet to be done (see Palekčić, in preparation). In the history of pedagogy, the relationship between interest and education is thematized by Lägeler, 2005, and interest and the willingness to appropriate is a significant theme in the works of some contemporary pedagogues (Sünkel, 1996).

4 *Education* is the process of training an individual to perform undefined functions in unpredictable situations. *Training* is the process of preparing an individual to perform defined functions in predictable situations.

sides change; the person that appropriates the contents of the world and the world that he appropriates by learning.

The pedagogical approach to the education system is manifested in the attitude that upbringing enables education (Anhalt et al., 2018). Educability is the assumption and result of upbringing and education. A complementary concept of educability is (pedagogical) tact (Winkler, 2018). Among educability, (self) education, tact[5] (Palekčić, 1999) and the educator (teacher), the activity of the subject/educator (interests, moral strength of character, and critical ability in appropriating the world) takes place. In this space (and bearing in mind the time dimension of this relationship), we theoretically establish and empirically seek the realization of the pedagogical theory of interest/motivation. One of the fundamental assumptions of (any) theory of motivation is the question of the causality that the theory implies. In contrast to the concept of linear (mechanical) causality in empirical psychological research (most often argued with statistical methods), the basic pedagogical/teaching structure[6] contains pedagogical non-linear causality.



5 In this context, education is also understood as the unity of knowledge and attitude (Petzelt, 1964). Motivation is an expression of one's attitude towards the subject of study and what has been learned. According to my colleague Mikhail Thomas (personal correspondence), motivation, from a pedagogical perspective, in institutional contexts can be differentiated threefold: motivation for learning, motivation during learning, and motivation through learning.

6 In the drawing/picture, the arrow from the teacher to the student's relationship to the subject indicates upbringing and the arrow from the student to the subject (self) education.

If the method of psychological motivation is put into relation with the pedagogical concepts of management, teaching (class), and counseling, then the psychologically formulated relationship between extrinsic and intrinsic motivation can be further developed. For psychologists, extrinsic motivation comes "from outside", and intrinsic motivation comes "from inside" (that is, from within the person). If that process is viewed from a pedagogical perspective, then the entire upbringing is an "outside" stimulus to the processes of learning, motivation and education are "from inside". The process of education is guided by upbringing, and it takes place through interaction between a person and the world, the world and the person.

However, this does not mean that upbringing and education are "external"; on the contrary, these terms (and activities) are in a dialectical, "internally" connected relationship. Hence, Benner (2018, p.111) distinguishes three types of causality; *the first*, educational causality, which, among other things, is triggered by questions and pointing operations, that is, which is triggered by pedagogues (educators and teachers) by using management, teaching and counselling procedures; *the second*, educational causality, which is based on the processing of positive and negative experiences by students themselves; and *the third*, methodologically based causality, which mediates between the first and the second and structures the process of learning and education without further educational support. This third methodical causality is characteristic of education (competence) to self-manage, self-teach, and to consult with others, that is, to advise ourselves.

An essential question for building a pedagogical approach to motivation in the education system is the following: is it possible to empirically find transitions from external (achievement and better school performance) oriented motivation to intrinsic (content) motivation? That is: is it possible to empirically determine the relationships (relations) between pedagogical influences "from the outside" and interest/motivation "from the inside"? To what extent this transition is conditioned or limited by a particular system of upbringing and education remains to be empirically ascertained.

The development of pedagogical theory, as well as the return to "domestic terms", is the prerequisite for an adequate answer to the question: is it meaningful or even possible to talk about a pedagogical approach to motivation, and not only about the pedagogical meaning of motivation theories (Deci & Ryan, 1993), meaning, are there pedagogical theories of motivation/interest as opposed to non-pedagogical, especially psychological theories? An affirmative answer to the

posed question is given by pedagogical theories of interest (Schiefele et al., 1979; Schiefele, 1974, 1993; Schmied, 1980; Wittemöller-Förster, 1993).

The dialectical relationship between interest and other fundamental pedagogical concepts reveals a complex structure of interest and encouragement, support and (self) motivation of all participants in the educational process (Müller et al., 2006). This created conditions for a specific pedagogical approach to motivation (not only within pedagogy as a scientific discipline, but also a pedagogical approach to motivation in the education system) as opposed to non-pedagogical, especially psychological approaches to motivation within a specific education system (Palekčić, 1989).

PEDAGOGICAL APPROACH TO MOTIVATION IN THE EDUCATION SYSTEM: (UNDEVELOPED OF ITS OWN, SPECIFIC) EMPIRICAL RESEARCH APPROACH

It is well-known that fundamental shifts in scientific research only occur when changes in empirical approaches to a phenomenon are accompanied by the possibility of accepting alternative theories. The inappropriate relationship between non-pedagogical theories (in our case, psychological) and pedagogical empirical research is the main reason for an undeveloped pedagogical perspective on certain issues (in our case, motivation) in the education system (Palekčić, 2019, p. 233). The research method itself is not enough, especially when it is taken from other social sciences (psychology and sociology), because the research method by itself does not lead to new pedagogical approaches, but recursively acts in the way of formulating and researching pedagogically oriented research subjects. By adopting methods from other social sciences, pedagogy only meets one criterion of science. The second criterion is the explication of one's own theoretical position. Therefore, "domestic" terms are required, a theoretically specific approach to that which is being researched, instead of the separation of the original pedagogical theory from the "externally" adopted methodological one.

In this way, in pedagogical empirical research, not only is the technical aspect of empirical research being satisfied (critically), but the cultural (innovative) role of the research is put in the foreground in such a way that the research creates alternative solutions to existing (psychological) research.

The general theoretical pedagogical stance is that upbringing enables education. This is the specificity of the pedagogical research approach to motivation in the education system. In the theoretical part of this paper, the relationship between upbringing and education is explicated, and also in connection with that, three types of causality (which should also be understood empirically). The presented differences between upbringing and education and the three-causal links (causality) in the processes of upbringing and education could lead us to make the mistake of associating the first causality with research and theories developed by upbringing science, the second one with those of the science of education, and the third one with interdisciplinary theories and research that should be jointly implemented by both mentioned sciences. However, quite to the contrary, the dynamics of the interaction of these three types of causality is the subject of pedagogy research.

Starting with this idea, in the empirical research of motivation/interest, we performed a critical analysis of theories of (intrinsic) motivation and a critique of the methodology of the psychological approach to researching motivation in the education system (based on the methodology proposed by Rucker, 2017 and Tenorth, 2010) (Palekčić, 2015, 2019). Based on this criticism, we extracted basic theoretical and methodological positions, which we reformulated into partial hypotheses for a series of empirical research activities on motivation in school learning and higher education studies.

In empirical (quantitative and qualitative – Palekčić, 2019, pp. 264–276) research we thematize the pedagogical approach to motivation in the context of education as an institutional activity (and the assumptions on which it rests – Palekčić, 2017) and in the context of two different institutional conditions within the framework of reforms education (the so-called "Šuvar's reform" of secondary education and university reform based on the "Bologna Process"). Thus, we illuminated not only the social functions of school/teaching in the well-known goal-means scheme (where it is more about training and less about education), but also the purpose and meaning of school/teaching: moral strength of character, multifaceted interests, own judgment (critical examination of the assumptions of acquired knowledge – education as a unity of knowledge and attitude) based on an argument. We were interested in the extent to which institutional conditions (as a result of reform changes) contribute to the prevention of original pedagogical

processes or to its encouragement, and how these conditions affect students' motivation/interest in different subjects.

We assumed (Palekčić, 2019, pp. 331–332) that intrinsic motivation is *an integral part of school learning* (Palekčić, 1985, pp. 303, 313; Palekčić, p. 22), as opposed to the understanding that it is observed only factorially (therefore, separated from school learning). Instead of viewing it only as a condition, or as a starting point, we assumed that intrinsic motivation is also *the result* of the organization of the school learning process. According to Herbart, interest is not only the starting point but also the result of teaching. Namely, "learning should serve to develop an interest from it. Learning should stop and interest should remain throughout life" (Palekčić, 2015, p. 395). We were interested not only in the already developed intrinsic motivation of students, but also in what kind of motivation results from a particular lesson, that is, whether the students acquire new motivations in the lesson (Palekčić, 1988, p. 22).

We assumed that *the relationship* between intrinsic motivation and external stimuli (organization and process of school learning) depends not only on the type of motive, but also on the strength of intrinsic motivation, considering different levels of knowledge and different degrees of understanding in school learning. This assumption is contrary to usual (psychological) research on the linear influence of intrinsic motivation on the school success of students. For that reason, we have, conversely, emphasized *relational*, *content* – different school subjects and different levels of teaching them, students of different ages and different types of schools, as well as *the social* aspect of motivation in school learning.

We were interested in whether there is *complementarity* (relationship of reciprocal action) (Palekčić, 1981, pp. 263, 367; Palekčić, 1985, p. 208; Palekčić, 1988, p. 23) between "external" incentives and "intrinsic" motivation. We wanted to highlight the existence of pedagogical causality in this relationship. We expected that we could empirically identify certain relational forms in certain teaching practices. With these assumptions and with an appropriate method of empirical research of intrinsic motivation, we expected to discover (or even better reveal) the mechanism of certain teaching, that is, the logic of producing certain motivation. So, we assumed that the type, form, and strength of intrinsic motivation in school learning depend on *the character* (Palekčić, 1989, p. 34; Palekčić, 1985, pp. 263, 317, 329, 338) of certain classes. We began from an idea that one should not investigate intrinsic motivation *per se* but look for motivation that is "intrinsic" to

a specific (found or formed through reforms of the educational system) teaching practice.

Numerous empirical studies of motivation, carried out by the author himself or in collaboration with other authors, have confirmed the justification of the initial methodological positions. We list several key results of our empirical research on motivation in school learning (primary and secondary school). The obtained results (Palekčić, 1981 – research carried out during the so-called Šuvar's education reform) confirm our assumption that the activity (certain teaching) corresponds to the purpose (encouraging motivation), and the obtained results (types and level of knowledge and intrinsic motivation) to actual state activities (teaching in different subjects and different schools). Thus, the quality of (class) teaching (Palekčić, 2009) appears as a significant moderator that not only mediates between intrinsic motivation for learning and non-specific and specific learning criteria, but also between the type and strength of intrinsic motivation for learning and the type and level of school outcomes. These relationships are interconnected and manifest in relational forms: the form of (stimulating) information and promotion or in the form of restraint ("inhibiting", "stifling", "preventing"). Relationships are not forced but possible, that is, probable, which is reflected in the differences between the actual state of teaching and the student's choice of what teaching should be like.

This research has also pointed out the importance of *content* (that which is taught) for the type and quality of student motivation (differences in interest in learning the content of physics and history in high school). Under the influence of psychological research in which content is being ignored or completely excluded, there is the disappearance of the so-called "third factor" (Süenkel, 2011) in pedagogical empirical research on motivation in the education system. The so-called Munich study (Palekčić, 2007) also showed the great importance (that which makes a difference) of the content, in which the set of relationships between student characteristics and the way the teaching is structured differ significantly, depending on whether it is about content from mathematics or content from grammar. Krajnović (2017) determined the difference in the type and quality of motivation, depending on the nature of the content that students learn in secondary medical schools.

We list several key results of our empirical research on motivation (and interest) in higher education studies (Müller et al., 2006a; Müller 2006b; Müller & Palekčić, 2005; Palekčić & Müller, 2005; Palekčić et al., 2004; Palekčić et

al., 2011; Palekčić & Müller, 2015; Sorić & Palekčić, 2005, 2009), which show a decline in the strength and power of interest/motivation during studies, but also, which is very indicative (in a longitudinal study – Müller & Palekčić, 2015), a decline in interest in study and the intrinsic motivation for study among students compared to the study before the introduction of the so-called "Bologna Process".

Thus, all our empirical studies of motivation in the education system (based on two major educational reforms, including those empirical studies related to the enrollment of students in secondary schools (Dunđerović & Palekčić, 1984a; Dunđerović & Palekčić, 1984b) have shown the failure of those reforms, if their results are measured by the degree of satisfaction of pupils and students, that is, by the degree and type of developed intrinsic interest in school learning, that is, studying. The so-called external motivation is overemphasized in education reforms. In the curriculum reforms, not only is there no place for the concept of upbringing, but the concept of education has also been reduced to the concept of competence. Namely, competences do not refer to a critical-reflexive attitude towards the world, but rather to the affirmation of given states (Palekčić, 2015, p. 363). Priority is given to economic criteria (utility, applicable-instrumental skills). In the pedagogical approach to motivation in the education system, the pedagogical term education does not exclude the concept of competence. On the contrary, it is mediated dialectically.

The results of our empirical research confirm our initial assumption that, methodologically speaking, one should not start from the (intrinsic) motivation (of pupils or students, i.e. teachers), but seek to discover the type and strength of motivation and interest generated by a certain system of upbringing and education, that is, to discover what kind of motivation and interest is inherent in him/her – what is "intrinsic" for him/her.

Arguments for a positive answer to the question posed in the introduction: is a specific pedagogically empirical-research approach to motivation possible as opposed to the psychological approach, that is, the approach of other social sciences and humanities are found in all of our theoretical and empirical research.

PEDAGOGICAL APPROACH TO MOTIVATION IN THE EDUCATION SYSTEM: (UNFULFILLED) ORIGINAL PEDAGOGICAL TEACHING PRACTICE

The indistinctness of pedagogical approaches, among other things, led to the understanding that (found) pedagogical practice is the field of application of the knowledge and results of basic disciplines and the dominance of "foreign terms". This has recursively influenced the configuration of the pedagogical field (Palekčić, 2017), that is, the technological understanding of practice, the understanding of pedagogy as an exclusively applied discipline (reducing pedagogy to instruction, i.e., didactics and methodology in the traditional sense) and not noticing the difference between pragma and practice (Böhm, 1995; Volker, 2007; Palekčić, 2015, p. 336), on the separation of science from profession (Palekčić, 2018).

Former pedagogical, theoretical, methodological approaches to teaching (original pedagogical practice) could not offer practitioners (all those who teach at any level of the educational system) a different view of their own practice, to understand it differently (its purpose and meaning) and to see it differently, hence the importance of the innovative role of the pedagogical approach to motivation in the education system.[7] The basic pedagogical and teaching structures (Sünkel, 1996, p. 64; Sünkel, 2011, p. 90) form the theoretical basis for the teaching practice that is appropriate for them (see drawing/picture). "An educational, that is, teaching mistake is not that which violates a certain norm, but what misses a certain structure." (Palekčić, 2015, p. 46)

Psychological research on motivation in the education system has offered only so-called pedagogical implications (Palekčić, 1988), that is, ways of applying their results in the given teaching practice, because the starting point was that psychology is the fundamental science of the practice of education. The design of certain classes was also not accompanied by the question of whether this practice has a pedagogical character, as much as it is focused on the relationship between upbringing and education (for what a pedagogical activity is, see Mikhail, 2016). For pedagogy and its pedagogical foundations (Biesta, 2017) the importance of teaching presupposes a critical analysis of the conditions under which the existing teaching practice is maintained (for example, at the university). What are its goals,

7 Unfortunately, the scientific project entitled: Teaching and learning at university – implications for the professional education of higher education teachers (2012–2013; Palekčić et al.), which was supposed to serve as a scientific basis for the design of university teaching, was not completed.

what does it strive for (for example, competences or education), what are its foundations (Reinmann & Sesink, 2014; Reinmann 2018a; Reinmann 2018b)?

Teachers' individual actions are not as important as their general focus. The very term teaching (German: *Unterricht*) indicates the direction (*Richtung*) between (*unter*) pupils/students and the content of education (Palekčić, Što *nastava jest,* book in preparation).

Teaching, (not only) at university, aims at education (Rucker, 2020b). It is focused on understanding what is being presented and researched. Interest in what is being studied arises (objectively) from the thing itself. Teaching at university is an invitation to apply one's own (critical) judgment (for both students and teachers). It is also a source of ideas for one's own research papers; to teachers for presentations, public lectures, research papers and projects, and to students, a source of topics and problems for seminars, thesis, or doctoral works.

If the teaching is too didactic (which is the most common case in our higher education teaching), it results in the contents being so simplified and made comprehensible that they lose their objectivity and demandingness. If there is too little didactic teaching in the class, it then redirects the class to the students, and the teacher becomes *a facilitator* of learning, *a coach*. This betrays the fundamental pedagogical relationship – the relationship of mediation and appropriation (education and research), that is, in school, the key pedagogical relationship, the relationship between teaching and learning.

The basic operating mode in teaching in higher education is *dialogue* (which does not exclude shorter lectures and necessary instructional activities and procedures). The selection of content (according to Klafki's theory of categorical education (Palekčić, 2006) is a key moment. Exemplary content should be accompanied by brief lectures. Using an example from university teaching (excerpt from the introductory lecture of the founder of pedagogy, Johann Friedrich Herbart, 1802), we show the difference between learning and studying, the meaning of the complexity of the teaching content and the importance of research during studies[8] (at least at graduate and doctoral levels). The premise for this is the critical questioning of the principle on which the organization of studies is based (the principle of transition from teaching to learning and the principle of alignment – Reinmann, 2018a).

8 Education through science, at university level, does not exclude the acquisition of necessary competences. On the contrary.

An excerpt from Herbart's speech on pedagogy (in 1802, which needs to be legitimized and argued beforehand as to why this particular excerpt, i.e. Herbart's entire text, was chosen): "But with every theoretician, even the best one, – while he applies his theory and does not approach the cases he comes across with the meticulous slowness with which a student solves his calculation tasks – between theory and practice, an intermediary element is inserted completely involuntarily, namely a certain *tact*, quick reasoning and decision-making, which does not always apply the same procedure as careless students, but cannot, at least as a fully developed theory *should*, boast that it follows the rules completely thoughtfully and with strict consistency and at the same time fully meets the real requirements of the individual case". From a pedagogical point of view, the appropriate form of teaching at university is research teaching that educates.

Students should read the text and try to answer the following questions on their own, based on the text: is the text simple, complicated, or complex? (Explain the difference), What is primacy and what is a priority in Herbart's understanding of the relationship between theory and practice? Does Herbart understand the relationship between theory and practice as a unity of difference or as a difference of unity? How does Herbart understand the relationship between knowledge and skill? How many models of the relationship between theory and practice does this text contain? (List and explain them!), Who is the subject of the text? In which state is the theoretician (active or passive) and how do we recognize it in the text? What are the components of pedagogical tact?

If the students do not answer the questions by themselves (and this has always been the case in my long university career), then I conduct a dialogue with the students in two ways: genetic (revealing the structure of the text) and Socratic (by asking questions and giving tasks, for example: Draw the relationship between theory and practices according to Herbart, bearing in mind the pedagogical difference!)[9]

A positive answer to the opening question: if it is possible to distinguish the original pedagogical term of teaching practice (educational teaching that educates – German: *erzieherenderUnterricht, der bildet*) from parapedagogical concepts in which the original pedagogical understanding of motivation/interest is manifested and can be developed, it is possible (at least partially) to give (a positive answer) based on our experience in university teaching. It remains as a *desideratum* that these and similar experiences are communicated and empirically confirmed.

9 More about the example (Palekčić, in preparation).

INSTEAD OF A CONCLUSION: A FINAL NOTE

The conclusion of this paper refers to a partially already developed (and/or in the process of further development) specific (*differentia specifica*) pedagogical approach to motivation in the education system. This approach, in our opinion, not only means a pedagogic and pedagogical approach to motivation within the institutionalized system of education, but also within pedagogy itself (primarily of its basic concepts). A pedagogical approach to motivation understood in this way enables pedagogy to achieve a balance between its own self-preservation and further scientific development. It is about regaining the "matter of pedagogy" through pedagogy itself. This means that not only the theoretical discourse, but also the empirical reality of "pedagogy" must be explored in the language and conceptual means of pedagogy. In this way, pedagogy is taking serious steps in the direction of developing a not-yet-fully-developed science from itself, which will at the same time participate more and more (not only) equally in interdisciplinary research on education (even in research whose topic is motivation in education), but will be able to offer its own knowledge about upbringing and education, which will be recognized and respected by other social sciences and humanities.

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INTEREST AS A PRINCIPLE OF ACTIVITY OF THE PEDAGOGICAL SUBJECT

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Abstract. The primary focus of this paper is the theoretical research of a possible *pedagogical* conceptualization of motivation. By pedagogical outlook, we mean a specific perspective that is implicit to pedagogy as a science, which necessarily determines and structures its objects of research. Following from this outlook, when it comes to particular object of this research, we will focus on the pedagogical subject. We will try to show that the pedagogical subject is characterized and distinguished by its *dynamism*, by its nature of *becoming* and not a static being. Further, we will have to inquire about the principle and logic of this becoming and activity. Are dominant ideas of motivation applicable here? Can they effectively activate the pedagogical subject and with which limits? Is there a *specifically pedagogical* logic of becoming that should be approached – both theoretically and practically – from equally specific points of view? Following these questions, we will try to consider J. F. Herbart's notion of *interest* and its further developments by authors such as Dietrich Benner and Andrea English as a "principle of activity" of the pedagogical subject and a specifically pedagogical kind of "motivation". We will try to conceptualize interest as a specifically pedagogical idea of motivation both from pedagogical theoretical perspective and from the perspective of practical pedagogical forming and sustaining of interest in pedagogical subjects.

Keywords: interest, activity, pedagogical subject.

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SUBJECT-OBJECTIVE PERSPECTIVE ON A HUMAN SUBJECT

Tha main focus of this paper is the possibility of a pedagogical outlook and conceptualization of a subject's activity. We approach the issue of activity from the perspective that all sciences and all ways of knowing are determined not only by qualities of the object being known, but also by subject that views and knows this object. This was the fundamental insight by Immanuel Kant (Kant, 1976) that has changed gnoseology forever. What this insight means is not only that we cannot talk about knowing as a purely objective category (even scientific methodologies are constructs through which we view objects), but also that the way in which a knowing subject structures his/her knowledge determines this same knowledge. Therefore, knowledge is not a "neutral" category, and we cannot talk about knowing objects of knowledge as such (an sich, per se). As Kant already found out, a knowing subject, through the act of knowing, gives form to amorphous material that originates in empirical reality and structures it into phaenomena. Before the knowing subject structures empirical reality through knowing, all we can identify is merely a transcendent (not transcendental), unknowable thing per se (Ding an sich) on the object-side of knowledge and a merely abstract subject that cannot constitute itself as a real experience without material for its form-giving thinking and knowing.

Kant says: "…each of our observations is nothing else than a notion (*Vorstellung*) about phenomenon; that things that we observe are not as such (*an sich*) the way we observe them, nor are their relations such as they are given to us; [translation Z. K.] (Kant, 1976, p. 65)". This means that in our knowing, we are never dealing with objects as such. Objects always appear to a knowing subject and what we are dealing with are always appearances (phenomena). That the object *as such* (*an sich, per se*) is *transcendent*, means that it is unreachable, unknowable as such. So, what we are to take away from this insight is that we cannot talk about knowing any object – but not merely *knowing* in a narrow sense because this is something that applies to the whole field of human experience – in an "objective way". The only object that we can experience is a *phenomenon*, which means, *object as such that is structured according to formal rules of reason* (which is subjective side of experience).

Kant says further: "Without senses, no object would be given to us, and without reason no object could be conceived. Thoughts without content are

empty and observations without reason are blind" (Kant, 1976, p. 73). There are several points we need to explain here. First, if we had no senses, we could not approach the empirical world and therefore "no object would be given to us". So, Kant claims there is no content in subject prior to interaction with the empirical world. So far, he is no different from empiricists like John Locke. But the reason he is completely different from Locke is in what follows: "without reason no object could be conceived". This means that at the same time as the empirical world is necessary for a subject to have "material" (*thing as such* which enables *phenomena* to appear to subject), the subject is necessary for this empirical material in order for it to become structured, to become some-thing, to become organized and make sense. The empirical world without a subject (reason) that structures it by interacting with it is merely transcendent, abstract "as such" (*an sich, per se*). This unity of subject and object present here is the reason why it is often said that Kant unified previously seemingly irreconcilable traditions of rationalism and empiricism. Kant sums this up clearly: "For knowing two things are necessary: firstly, a notion with which an object is being conceived (category) and, secondly, an observation through which an object is being given" (Kant, 1976, p. 111). So, we, as humans, also need two fundamental faculties in order to know: we need thinking which produces ideas (forms of empirical reality) and senses which enable us to observe empirical reality.

The final point regarding Kant's insight that will be important for this paper is expressed in a clear manner here: "So, categories by means of observations enable knowing things only if they can be applied to *empirical observations*, that is, they serve only the possibility of empirical knowing. This knowing is called *experiencece*" (Kant, 1976, pp. 111–112). What is an important and explicitly stated (new) element here is that Kant says that what he is talking about is "empirical knowing". So, he does not talk about purely rational deductions that would be able to structure the whole of reality purely from the position of mind (subject). He is saying that the kind of knowing he is talking about in *Critique of pure reason* is applicable only to the empirical world. This is fundamentally different from metaphysical thinking. Therefore, he calls this knowledge "experience". Experience is unity of an empirical object and a subject's knowing (in the broadest sense of the word – not merely "cognitively") of this object. It would be inappropriate to interpret this only as a cognitive relation of subject-object.

To sum up these insights: firstly, there is no *thing as such* that could be object of experience. We experience only *phenomena* which are objects structured by reason. Secondly, all experience is a unity of reason and the empirical world, and we need both to constitute experience. Thirdly, knowledge that is conceived here applies only to empirical reality and not to metaphysical reality.

PEDAGOGICAL CONCEPTUALIZATION OF ACTIVITYAND ITS CONDITIONS IN THE IDEA OF A PEDAGOGICAL SUBJECT

Following these fundamental insights about the nature of subject, object, and experience, we set the primary focus of this paper as a question of *pedagogical* conceptualization of the activity of a subject (this activity being the object of our investigation). By this, we mean trying to construct and reflect the concept of an activity that would appear from the pedagogical theoretical framework (and by this we mean from a pedagogically constituted subject and its forms of thinking). But a pre-condition for asking about *activity* is the question about the *subject* of which this activity is an attribute. Therefore, the notion of a pedagogical subject that we develop will determine what we see as a real and desirable activity.

This approach follows Kant's insights because here we start with the point that there is such a thing as "pedagogical perspective". This means a pedagogical "frame of mind", a pedagogical theory that structures the way it sees its objects. So, if we approach the object of our investigation – activity – from the pedagogical theoretical framework, this activity will not be conceived the same as if we approached it from some other theoretical framework. Apart from our own theoretical work when dealing with this topic, those insights will serve us as fundamentals when we ask the question: what does a pedagogical subject look like? What Kant found in his investigations cannot be restricted to a merely "philosophical subject" or "scientific subject" or "cognitive subject" in a narrow sense. He discovered the logic of experience as such. One might ask why would we seek such a thing (the pedagogical conceptualization of activity), especially in the context of today's almost complete multidisciplinarity and even transdisciplinarity. The answer is that, prior to a multidisciplinary approach, we have to have clear ideas and notions about our disciplinary approaches. Only self-conscious disciplines and well-defined thinking that is theoretically founded in

various distinct disciplines can enter into a productive dialogue that constitutes multidisciplinarity. Without this condition, multidisciplinarity would be merely imprecise, undefined, inconsequent, perhaps even contradictory "thinking" and "knowledge". So, if the *pedagogical* conceptualization of activity (of a pedagogical subject) can be theoretically developed in a distinctive way, then we could not only think, but also practically approach and act towards pedagogical realities in a distinctive way which is perhaps underrepresented today, and which could contribute to a broader dialogue on activity and motivation.

The question we need to ask prior to that of the pedagogical concept of activity is how *pedagogy* views a (pedagogical) subject, because activity is not an abstract thing – it is always the activity of a certain (human) being and an inner possibility of a specific kind of subject. Already in the way we think and know a pedagogical subject we will set up structures that determine possibilities of how the concept of activity (of that subject) will appear to us.

So, what is the distinct way in which pedagogy structures pedagogical subject? First of all, pedagogy begins with the perspective of *Bildung*. When Dietrich Benner discusses developments that followed artificial distinctions of "formal" and "material" *Bildungstheorie*, he says that: "Sie [Nicht-affirmative Bildungstheorie] gründet Bildung auf ein Mensch-Welt-Verhältnis, in dem nicht formale Kräfte der Einzelnen und objektive Anforderungen der Gesellschaft unvermittelt einander gegenüberstehen, sondern Bildung als eine Wechselwirkung von Mensch und Welt gedacht und konzipiert wird, in der der Mensch sich in Auseinandersetzung mit der Welt selbst bestimmt (Benner, 2010, pp. 155–156)". This *structure* upon which Benner explicates the idea of *Bildung* and relation of humans and world is very similar to what Kant found. The *logic* of human-world *(inter)action* is also very similar. The central point here is that *Bildung* can not be understood properly either if it's understood *only* as a principle of forming of subject (similar to how purely rationalistic approach would work), or if it's understood *only* as an "objective", material side of forming that determines *what* the subject becomes (in a manner in which empiristic and positivistic approaches function). *Bildung* is a unifiying principle that has to take dialectic of these two sides as its logic. If we understand *Bildung* only as a formal principle of forming of a subject, we don't see the relation with world and content of experience. If we understand it only as taking form of *material* of *Bildung*, we take a deterministic, positivistic approach which doesn't enable us to see subject as an active and (self-)transformative being. Here we can

see that a Kantian subject and a pedagogical subject which stems from the idea of *Bildung* are very similar both in structure and logic of their action.

Further, refering to Wilhelm von Humboldt, Benner says "Bildung als freie Wechselwirkung des Menschen mit der Welt gründet sich diesem Verständnis zufolge aud eine Wechselwirkung seiner "Empfänglichkeit mit seiner Selbsttätigkeit…" Anders als in der sonstigen Natur ist Bildung beim Menschen auf kein Telos ausgerichtet. Sie vollzieht sich zwischen "Entfremdung" und Rückkehr aus der Entfremdung (Benner, 2010, pp. 166)". Not only is Bildung an interplay of the formative principle of a pedagogic subject and the material principle of a pedagogic object, but it has no *telos*, which means it has no final purpose. So, Bildung is unity of a subject's activity and receptivity, of its alienation and reflection of this alienation back to itself. For this formal structure of action, it does not matter if Benner's and Humboldt's formulations here follow pure Kant's perspective or its development in Fichte (Fichte, 1974) where Kant's idea of a subject is developed further as that which self-sets and self-produces the world of objects. This would matter if the origin of objects was our primary focus and it is also pedagogically relevant in some other ways, but the structure of activity remains the same. In both cases (Kant's and Fichte's) the subject's inner activity follows the same logic that Benner explicates here. What is also important to note here once again is that the "objective side" of this relation, also when it comes to Kant and not only Fichte, is a *phenomenon*, which means an object that is *conceived by a subject* and not the object as such. So, an object is not merely an abstract object. This will have big implications later when we talk about the logic of *interest*, which is always dependent on its objects. If objects in this logic of Kant's and the pedagogical subject are not *objects as such*, but *conceived objects* or *phenomena,* this has great implications. But we will discuss this further on within the topic of interest. With Fichte it is even more clear that objects are part of a subject's self-consciousness since *das Ich* as subject *produces* objects in Fichte's particular development of Kant's idea of a subject. "...the "I" *is* and *establishes* its being by means of its being. – It is at the same time that which acts and a product of action; the acting and that which is produced by action; the act and the product are one and the same; and therefore: *I am* is an expression of an effective action (*Tathandlung*)... (Fichte, 1974, p. 46)".

The logic of pedagogical subject that Benner expressed, established in the logic of *Bildung*, which follows Kant's and Fichte's conceptions is the same

thing that Elmar Anhalt recognizes when he talks about Herbart's principle of *Bildsamkeit*, which enables *Bildung*, when he says: "Bildsamkeitentwicklung meint die selbstbestimmte Modifikation der "Fähigkeiten des Weiterkommens" als eine spezifische Form von organismischer Aktivität des Edukanden (Anhalt, 1999, p. 81)". Anhalt's main focus is a bit different, but it's actually a different expression of the same logic. Anhalt emphasizes the *ability* for *Bildung* (*Bildsamkeit*) and says that development of this faculty means a self-determined modification of ability for further development. Anhalt says this is a specific form of *activity of pedagogical subject*. The ability for Bildung means self-determining ability of subject to change him/herself through self-activity.

We can already see through what we have developed so far how we could think of activity from a theoretical-pedagogical perspective. It is the activity of a subject built upon the idea of Bildung, which is a pedagogical formulation of Kantian logic of subject-objectivity, whose activity consists of continual self-determination through a subject's interaction with the conceived world. This is self-becoming of a pedagogical subject, mediated by experience.

In their discussion about what *Bildungstheorie* means, Rucker and Geronimo say: "To describe Bildung as complex means that it must be defined as an irreducible interplay of components. Wilhelm von Humboldt made this element an explicit subject of discussion (Humboldt, 1973, according to Rucker & Gerónimo, 2017), as he defined Bildung as a "linking of the self to the world" that possesses the form of "interplay" (Westbury et al., 2000, p. 58). In this interplay an individual deals self-actively with the world. In the self-active dealing with the world the individual determines his relationship to self and the world (Rucker& Geronimo, 2017, p. 7)". This is a very clearly expressed formulation of the above thoughts, which identifies "interplay", self-becoming, "linking of the self to the world" as a central idea of Bildungstheorie. Activity in this sense is at the centre of pedagogical outlook, based on the idea of Bildung.

We will now take a moment to differentiate between the idea of *Bildung* and the idea of *learning*, especially since today the idea of learning has become very dominant in research that deals with education. Bildung as the subject-objective logic of self-becoming is fundamentally different from learning. Even if we are not talking about any kind of conditioning in learning (regardless of whether it is classical or operant) or principles of reinforcement and punishment in learning or generalization/discrimination of stimuli in learning or issues of memory in learning

(Hulse et al., 1975) (which are all completely different than any "inner" experience of self-becoming and *Bildung*), theories of learning still leave us mostly within perspectives of neuroscience and behavioural science. There are, of course, attempts within this broader standpoint of investigating *learning* to include social and cultural aspects of learning or memory (for example – Weldon, 2001, pp. 67–115), but these standpoints only view interactions of psychological processes with processes in social interactions and culture and do not discuss the inner logic of a self-forming subject. If we talk about social learning theories like that of Albert Bandura's and if we disregard observing, modelling, and imitating as purely behavioural and mechanical approaches and modes, we can say that even symbolic learning within this framework functions only in the frame of succesful adoption of the object of knowledge (Zarevski, 2007, p. 143). If we were to talk about activity connected to learning understood in these ways, it would always have to be grounded in some idea of "success", "desire for effectiveness", "desirable object", which would drive activity or, in reverse, an undesirable, harmful or feared object. In any case, activity would have to function in a means-end scheme.

When applying research in the psychology of learning to the field of education, we can see that what most often happens is the development of various techniques of *effective* learning, coding of information, effective reading, and remembering (Howe, 2002) and similar practices, none of which tell us anything about (self-) transformation in the sense in which we have tried to formulate the pedagogical idea of activity. That is not to say that this research is irrelevant or unimportant, but only that it is fundamentally different from what a pedagogical outlook can provide. As we stated at the beginning: all these perspectives with their inner possibilities and various developments can give us valuable input in our educational practice.

Pedagogy, as long as it understands *Bildsamkeit* and *Bildung* as its central principles, deals with (self-) transformation of pedagogical subject and not with acquiring skills, competences and mere knowledge, which are all on the abstract object-side of pedagogical subject. It is clear that Bildung is a category of *being*, not *knowing,* and that a pedagogically understood activity is a practical mode of pedagogical being itself and not something that functions in a means-ends scheme.

ACTIVITY AS A PROPERTY OF THE HUMAN SUBJECT

The above discussion on Bildung and the idea of a subject, in the context of questions about the pedagogical conceptualization of activity was necessary to see *which notion of activity* is pedagogically meaningful. A notion of activity that does not follow from the inner dialectic of a pedagogical subject would not be pedagogically constituted. We have come to the position that a pedagogical activity is one which finds its source in a pedagogical subject founded on the idea of Bildung. These subject experiences him/herself as interactivity of self and the world, of subjective and objective self ("conceived world", *phenomenon* being an objective self and not object as such) and is never ab-solved in either of those parts of self, but instead exists as permanent self-setting into an object (in Fichte's sense) and reflection of that object back into the subject-side of self. Therefore, we can now say that a subject experience itself as *inter-esse* (being-in-between), as inner tension of its own existence between the subject-side and the object-side of self. This also means that activity that is motivated through any kind of means-purpose relation, where purpose is outside the subject, does not support activity of the pedagogical subject. "Objective self" and "world" (which is material for Bildung) is nothing like the world of "goals" or "goal-oriented purposes".

Activity in a pedagogical sense is therefore an *inner quality of a pedagogically understood subject* that should be cultivated as part of a subject, the person in question. It is an existential category and not an outside driving force. This conceptualization has far reaching consequences for how we practically approach educating and cultivating this kind of activity through pedagogical relations and instruction (*Unterricht*). Pedagogical activity should be educated taught as part of a pedagogical subject, so that it is a permanent experience of one's self as an active self. This means self-activity, not activity based on the environment. If the environment was the primary source of the activity of a pedagogical subject, then this subject would not be able to initiate change and transformation – not only of one's own self, but of the outside world as well. A pedagogical subject and pedagogical work are, by definition, *initiators* of change, an active and not merely re-active element in the world. So, pedagogical activity should not depend on anything driven primarily from the outside, such as instincts (Evans, 1978, p. 19; Beck, 2003, pp. 144–152), desirable objects, and outcomes in the sense of desire for achievements (Evans, 1978, p. 73; Beck, 2003, p. 317; Rheinberg, 2004, p.

53), "desire for power" (Beck, 2003, p. 329; Rheinberg, 2004, p. 87) etc. It should be cultivated to become a property of the pedagogical subject him/herself. If this is a demand that we make following the above pedagogical investigation, then it is clear that these approaches, which function almost exclusively in the field of experimental psychology and in the domain of behaviour, cannot satisfy us. When we ask about reasons (question "why?") for the inner activity of a pedagogical subject, we are much more in the field of philosophy and philosophical pedagogy, than in the field of psychology. As M. Palekčić notices: "Following Desai (Deci, 1975, p. 4, according to Palekčić, 1985), a big part of [the] answer to the question 'why?' doesn't belong in the field psychology, but in the field of philosophy or metapsychology…The fact that there is a certain gap between question about the essence of human being and the way in which psychologists (of motivation) solve it is more than evident. This controversy was maybe best explained by Piaget, who pointed out (Piaget, 1979, p. 110, according to Palekčić, 1985) that "…the science of psychology, just as any other science, relates only to that which can be observed, while philosophy strives to reach the nature of things and their "essences" (Palekčić, 1985, p. 146).

On the other hand, it is clear that pedagogical activity is also inter-esse between the subjective and objective sides of the pedagogical self. But the objective side of self is very different from *motives*, desired outcomes, or desired objects that exist outside reality. The objective self has the character of *experience* (of the outside world), of *phenomenon*. This objective side of the pedagogical subject cannot exist independently from the "outside world", but it is not the same as the outside world. This is something we have tried to explain through Kant's insights. That is why the objective side of self in relation to the subjective side of self does not exist in means-end relations, which is the case with "desirable objects" that exist outside of the subject and serve as initiators of motivation. It is the difference that we have seen through Kant's philosophy between thing as such (*Ding an sich*) and *phenomenon*.

Following that, in the practical sense, when we wish to educate and/or cultivate an active pedagogical subject, we cannot rely primarily on goals which will drive the subject, but on self-understanding and self-experience of the subject, which itself should be formed. This self-understanding means that a pedagogical subject should come to understand him/herself as something that does not have permament "identity", permanent form, permanent state, but something that is in its

essence change or transformation. To know that I am not merely "me", some kind of "ego", but primarily the possibility of becoming, to be something else and more than what I currently am is the central understanding of and for a pedagogical subject. If a subject is to be and stay active in the way in which we seek activity, this understanding has to become a necessary part of one's own self-consciousness. In the realm of self-experience, we have to bring a pedagogical subject in the state of creativity and productivity, without which we have purely stagnant reproduction of one's own life practices. Through his various concepts, Friedrich Nietzsche formulated the idea that a human being in his/her essence is activity (not merely *active*, but that a human being itself is not a *state* but a *productive activity*). For example, when he talks about the idea of over-man (Übermensch) in *Thus spoke Zarathustra*, he points out that since all final truths as objects towards which we could strive are "dead", the last way in which we can continue to meaningfully exist is where we, as humans, *produce* meaning and live as a perpetual transcending of what we are (Nietzsche, 1991). His meaning is that we literally produce ourselves through our will and then negate/transcend what we have produced because nothing we *can* produce has the character of stable truth which we could hold onto. Trying to hold onto any truth that we have produced would mean living in the image of a false god. So, Nietzsche says here that human existence itself and the human subject itself it *productive* and this is an essential characteristic of the human subject. This productive and self-transcending character of a human being is again a formulation that is very similar to what we have already explicated, but it is particularly emphasized here in Nietzsche's philosophy that a human subject is in its essence active in the sense of self-production. Nietzsche is therefore a deeply pedagogical thinker. This activity that we can find in Nietzsche's idea of the human being obviously belongs to the inner structure of the subject itself and not to anything that would depend on some kind of objectivity.

INTEREST AS A PEDAGOGICAL NOTION OF ACTIVITY

There is already a well-established idea and history of its development in the context of pedagogical thinking, which works on encapsulating this kind of self-activity of a pedagogical subject, which is explicated in pedagogical literature under the name "interest".

However, Henriette Lägeler gives this diagnosis: "Aber spatestens seit dem 2. Weltkrieg wurde das Thema "Interesse" unter padagogischen oder padagogisch-psychologischen Gesichtpunkten dann kaum mehr eigens aufgegriffen (vgl. Prenzel, 1988, p. 46, according to Lägeler, 2005). Allenfalls gewann es unter dem Begriff der "Motivation" in der lerntheoretischen und differentiellen Psychologie eine marginale Bedeutung. (Lägeler, 2005, p. 17)". This background is another reason why a further continuation of development of notion of activity as interest could be important for pedagogy. We've already noted how concepts of activity based on the idea of learning do not really come from the pedagogical point of view, because learning is fundamentally different from Bildung and has a completely different idea of subject in its background.

Regarding pedagogical ideas of interest and quoting Wilhelm Dilthey, Henriette Lägeler says (Lägeler, 2005, pp. 26–27) "Unter Interesse versteht Dilthey" den Anteil der Seele an einer Vorstellung oder Vorstellungsverbindung" (D1, p. 209, according to Lägeler, 2005) und weiter bezeichnet er es als "eine Art von Gefühl", welches in der Aufmerksamkeit eine Spannung anregt, "welche dem Willen vergleichbar ist" (D1, p. 209, according to Lägeler, 2005). "What should be particularly noted here is that Dilthey regards interest as "a part of the soul" that rests in a representation (Vorstellung) or connection of representations. Dilthey literally says here that while in the state of interest, human soul *is*, in one part, one and the same with its "object" (representation). Not merely that it (soul) takes an object in itself or merely reflects *on* the object, but that it in part of its very existence *is* its object. This is very reminiscent of Kant's "conceived object", which is an object-side of self. Further, Dilthey says that interest is "a kind of feeling" which produces tension through attention. He also compares this to our *will*. This quote and thought shows very well the tense seed of activity that is always present in human subject when (s)he is understood as interest. To be in-between subjective and objective side of self, to never be a state, but always a becoming, to always self-produce and reflect and transcend that which is self-produced, means to be in the state of productive "tension". Apart from pointing out this tension, we see an essential role of attention as well. Only a spirit that understands him/herself, that is awake, that truly thinks and self-reflects, which exists as its *actus* can existentially experience this tension.

Later in her book, Lägeler refers Dewey's notion of interest, saying "Ich und Welt sind in einer sich entwickelnden Situation miteinander verbunden (vgl.

DW3, p. 126, according to Lägeler, 2005). Diese Definition verbindet Dewey mit den etymologischen Wurzeln des Begriffes "Inter-esse", wobei das Interesse die Kluft zwischen der Person und dem Gegenstand sowie dem Ziel der Handlung überwindet: "The etymologie of the term inter-esse, 'to be 'between' points in the same direction. Interest marks the annihilation of the distance between the persona and the materials and results of his action (Lägeler, 2005: 38); it is the instrument which effects their organic union" (DW1, 122, DW2, 160, according to Lägeler, 2005). Dewey points out the union, oneness of subject and the world in the "(self-) developing situation". He further points out the etymology of the term interest, which "annihilates the distance" between subject and object. Again – interest expresses a dialectic nature of subject itself.

We can see the same approach, at first glance, in quite a different pedagogue from Dewey: J. F. Herbart; but it has many very comparable basic ideas to Dewey, as Andrea English has shown in her investigations. Herbart says: "It is true that we are inwardly active because we are interested, but externally we are passive till interest passes into desire or volition. It occupies the mean between mere observation and attainment (Herbart, 1987, p. 129)". In this quote, we can see that Herbart shares the same position of interest being an in-between of the subject- and object- sides of self, but he also stresses that interest is a "theoretical" kind of activity, the inner activity of a subject. It is this inner experience of tension that Dewey talks about as well, but while it is mere interest, it remains an inner part of the subject, that which has not yet become practice. That is why Herbart further develops a way for interest to become practice. But interest as an inner activity remains the source of practical activity, which could not even be started properly without interest. Practice without developed interest would be pseudo-pedagogical, a not-educational, non-transformative activity.

Andrea English (2013) says: "The 'objective character' comprises all the choices one has made thus far in one's life". This side of oneself is objective because it is already formed through choices that, to a large extent, have become habits and routines. The "subjective character" refers to the reflective self, who judges the objective self, potentially critiques past choices, and creates new rules and future conduct (SE 2'-01/AP 90-91, according to Engslih, 2013). These two sides of ourselves come forth as divided when we are faced with new and unfamiliar situations. If we choose to follow routine, then our past dictates our choices, so that we are guided by our objective side. If we make a conscious decision to break

a habit by deciding to act differently from in the past, then we are following insights of our subjective side (English, 2013, p. 19)". In this brilliant passage, Andrea English (2013) not only shows what subjective and objective part of the self are, but also how a subject acts if (s)he is focused on the subjective or objective part of self. The subjective part of self and its development through reflectivity and discontinuity of experience is an agent of critique and transformation, of dynamic and dialectic of being as a process; it is a part of self that originates in that which is possible and future. The objective side of self is that which originates in what is already present. By itself, it is uncritical, static, and rooted in what already is. Again, to ask which one of these two parts of self is the "true" one, the answer is again: both of them in their dialectic. The transformative, productive subjective side of self is a moment of negativity of experience. It enables us to transcend, transform and change. But without a self-setting objective part of self, there would be no form, no "content" to transcend. Only in their dialectical unity do these two parts of self form the idea of the subject as a *process of being* and in that as an activity of the pedagogical subject.

To further point out the logic of pedagogical being and becoming, English says: "...it is helpful to understand the basis for his (Herbart's) conceptual distinction between 'one-sidedness' (Einseitigkeit) and 'multifacetedness' (Vielseitigkeit). The one-sided individual and the multi-faceted individual each relate differently to the new in experience. The one-sided individual can only understand familiar and trusted things in his/her surroundings, such that s/he either cannot perceive unfamiliar objects, simply ignores difference, or, perhaps more problematic, distorts everything else to the point of 'falsifying' it entirely through a 'habitual frame of mind'. So, in Herbart's terms, we can say that a one-sided individual has a mind that has not been awakened to the many ways we can see and be in the world. Contrastingly, a person who has 'many facets' describes someone who is moved by the new, so that s/he becomes 'interested' in the new objects and ideas that s/he encounters" (English, 2013, p. 19-20). This shows us that a truly pedagogically active and self-aware subject is "hungry for the world", "open to experience", "open to otherness", "open to change", open to that which (s)he isn't yet. This idea can almost be understood as constituting the whole pedagogical ethos – pedagogy cannot be enclosed in any boundaries – a pedagogical being is a cosmopolitan being in the deepest and broadest sense.

CULTIVATION OF ACTIVITY THROUGH PEDAGOGICAL PRACTICE

A further question that remains after this attempt at the theoretical conceptualization of interest as a pedagogical idea of activity is how to structure pedagogical practices that would educate this kind of subject. We have an idea and structure of the subject we wish to help someone to become. We understand the logic and dialectic of being of such a subject. So we have to further develop concrete practices and relations through which we can develop this kind of subject. What can already be said, even prior to this investigation in its proper form is that we need to cultivate reflection, multifacetedness, and plentiful opportunities to interect with varied "contents" in the world. We should cultivate the disposition of healthy doubt and never being certain about things – always exposing all "truths" to questioning. We should cultivate self-experience of non-egoism that transcends any final "identity" and understands that before and more fundamentally than any "identity", we are all open possibility. Before final states, we are all dynamic becoming. Before mere "opinions", we are the possibility of thinking.

By pointing out this general direction, we can conclude here by quoting Thomas Rucker from his article *Teaching and the Claim of Bildung: The View from General Didactics*: "As I try to show below, Bildung supportive teaching is rather aimed at enabling students to reach (objective) insights (which rules out the reduction of teaching to mere instruction), and beyond that, at leading them to making their own judgments" (which is where it ceases to be "mere" teaching, strictly speaking). This consideration of describing teaching as the enabling of activities of recognition and valuation and – associated with this – radical reflection is based on the assumption that teaching can only be Bildung-supportive if it leaves room for the (Benner, 2015, p. 289) "self-relationship of the learner with what is being learned and taught" (Rucker, 2020, p. 8)".

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CONCEPTUALIZATION OF MOTIVATION IN HIGHER EDUCATION: THE EUROPEAN UNION EDUCATIONAL POLICY*

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Abstract. The aim of this work is to analyze the conceptualization of motivation in higher education in political documents of the European Union, and its pedagogical implications. The key characteristics of the conceptualization of motivation in higher education are perceived in the example of a series of published Communications of the European Commission in the period 2011-2020. Although the European Union does not have formal authorization over the education systems of Member States, it exerts its influence through so-called soft measures and coordination. Three key aspects in understanding the motivation in higher education can be singled out by analysing the contents of six published Communications. The first aspect refers to the instrumentalisation of motivational beliefs in the value of higher education. The second one refers to the reconceptualization of motivation as the rational investment into skills in line with the dominant human capital theory in the European political agenda. The third aspect repositions students as consumers in the market of educational services, who should be enabled to have an informed choice and diversified offer of studies, programmes, courses and their organizational forms. On one hand, this agenda neglects the pedagogical aspects and intrinsic values of education, multidimensionality, and complexity of motivation in higher education, and on the other it normalizes the image of the world and the relation of a person towards the world from the perspective of economic rationality.

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INTRODUCTION

The topic of this work is viewing the conceptualization of motivation in higher education from the perspective of the EU educational policy. The key characteristics of conceptualization of motivation for higher education are considered in the example of six published Communications of the European Commission, which entirely or significantly deal with higher education, in the period 2011–2020. Since the EU does not have legislative authorization over the education systems of the Member States, it exerts its influence through instruments of organized political initiatives and by stating its opinion. The EC Communications represent a significant form of public promotion of opinion, vision and values of the EU regarding the policy of higher education.

The work consists of three smaller parts, in addition to the Introduction and Conclusion. In the part called *Motivational beliefs in the value of higher education: imperative of instrumentalisation* the characteristics of operational understanding of the value of higher education and the pedagogical implications of such an approach are analysed. The second part called *Reconceptualization of motivation as the investment in higher education* accentuates the economic agenda in bringing the theme of motivation for education based on the human capital theory and its key term – investment into skills. The third part, named *Student as a consumer of educational services: motivational implications,* considers the characteristics of the new position of students compared to the standard model of university education, which is marked as "student-centred learning". In the context of the massification of the higher education system and its connection with the labour world, the students should be enabled to have a diversified offer of educational services and transparent information which are the prerequisites for an informed choice of studies, programmes, and courses relevant for modern needs of knowledge economy. The Conclusion sums up the basic premises of the EU educational policy in the conceptualization of motivation in higher education in three directions: instrumentalisation of higher education value for external purposes, focusing on

economic aspects of investing in human skills during a lifespan and positioning students as sovereign consumers of educational services based on informed rational choice.

MOTIVATIONAL BELIEFS ON THE VALUE OF HIGHER EDUCATION

The value of higher education (and education in general) is considered in the analysed Communications dominantly from the instrumental perspective. The very terminology has been modified, and education is reconceptualised as acquiring skills or the development of human capital. In the very title of Communications, this turns towards an economic agenda is highlighted, for example "Supporting growth and jobs – an agenda for the modernisation of Europe's higher education systems" (EC, COM 2011, 567), or "Rethinking Education: Investing in skills for better socio-economic outcomes" (EC, COM 2012, 669).

Higher education is comprehended as an instrument to achieve various social goals, such as economic growth, increasing productivity, preparing graduates for the labour market, employability, social cohesion, and the like. It should provide "skilled human capital" (EC, COM 2011, 567, p. 2). Knowledge economy needs people with the right mix of skills. The needs of public and private employers have a crucial role in defining goals, contents, methods, and outcomes of study programmes, with a special emphasis on appropriate sets of skills. Due to changes in the nature and dynamics of the work process, the emphasis is on the so-called transversal skills – e-skills, creativity, flexibility, problem solving, teamwork, communicating in foreign languages – in addition to the common request to attain knowledge in the selected field. (EC, COM 2012, 669, pp. 3-4). The key word in all Communications is skills.

It is clearly indicated in the EC Communications that higher education systems should maximize their contribution to smart, sustainable, and inclusive growth in four key directions: (1) increasing the quantity of higher education graduates at all levels; (2) enhancing the quality and relevance of human capital development in higher education; (3) creating effective governance and funding mechanisms in support of excellence; and (4) strengthening the knowledge triangle between education, research, and business (EC, COM 2011, 567, p. 3). In that respect, employers and labour market institutions are openly required to be included in

the designing and delivering of programmes and including practical experience in courses, in order to reconcile present and emerging labour market needs, as well as to foster employability and entrepreneurship. Such requests are the biggest turning point in higher education policy compared to the millennial history of university education in Europe. Although economic motifs have always been latently present, they have never been of decisive significance for defining the purpose of university education. It was not the characteristic of the Humboldtian model of classical German university, whose institutional innovations were internationally accepted in the sense of promoting the unity of teaching and fundamental research, academic freedom of students and professors, and university autonomy compared to the outside world (politics, economy and the like). In the 19th century, university education was institutionalized as a public good, which was not provided in the market but with stable financial support from the state. Starting from the idea that development of sciences could not be planned from a certain centre, that it was connected with individual talents of motivated professors and students; university education was defined as the guard of all scientific disciplines, which improved, over a long period and frequently in an unpredictable manner, social development in the broadest sense. Connection with the direct needs of the economy and regional development was characteristic for other higher education sectors – vocational education and training (VET). Nowadays, through EU soft measures that are implemented via versatile projects and instruments (Bologna Follow Up Group, EHEA, ERA, student mobility programmes, U-Multirank), the entire higher education system has been reconceptualised in accordance with VET principles. It is even emphasized for doctoral studies that it needs "industry relevant doctoral training" (EC, COM 2011, 567, p. 5). It is openly pointed out that "more people need to be attracted to the fields of study that prepare students for jobs where shortages exist or are emerging" (EC, COM 2017, 247, p. 4).

The crucial issue for Member States and higher education institutions is to stimulate the development of entrepreneurial, creative, and innovation skills in all disciplines and in all three cycles. Therefore, higher education is overall comprehended as more a private good than a public one, which implies privatization in a threefold sense: providing, financing, and managing institutions that provide higher education in the market of educational services. EC suggests that legal, financial, and administrative restrictions should not limit the freedom of an institution/provider to define strategic structures and to differentiate itself

from its competitors (EC, COM 2011, 567, p. 9). Instead of self-government, engagement of professional management is requested, which provides strategic vision and leadership. It suggests that financing should be linked to performance, simultaneously including various private sources. Therefore, the Commission supports transparency and excellence through evidence-based policy analysis, development of analyses, and collecting information on all aspects of performances (EC, COM 2012, 669; EC, COM 2016, 941; EC, COM 2020, 625).

It can be clearly seen in all analysed Communications that the value of education is dominantly perceived as an instrument for achieving external goals. In no segment of higher education is the significance of authentic commitment to content of education based on intrinsic motivation, love for science, curiosity, feeling of personal fulfilment, transformative powers of new insights, and educational experience highlighted, as such. In view of all the above-mentioned, it can be concluded that a pedagogical approach to motivation for university education traditionally conceptualized in the form of intrinsic interest and affinity for scientific-research work has been replaced by economic interest, which was previously characteristic dominantly for VET sector. Contribution to the reform of the higher education system is expected to happen in that direction. "Europe will only resume growth through higher productivity and the supply of highly skilled workers, and it is the reform of education and training systems which is essential to achieving this" (EC, COM 2012, 669, p. 17).

When economic aspects become the key agenda of the entire policy and system of higher education, then, from the pedagogic standpoint, we can join the critics who warn of the dangers of the so-called economic imperialism.

In *Manifesto for a Post-Critical Pedagogy* (Hodgson et al., 2017), the founders of the so-called post-critical pedagogy asked a fundamental question: whether the essence of higher and any other education is solely in "education for …". The post-critical pedagogy rejects economic imperialism and instrumentalisation of education, and it insists on its inherent value (Snir, 2021). Education possesses its own value, which must be preserved and fostered on all levels of education. Otherwise, this value may be forgotten and lost, not only for us but also for future generations. Education preserves the continuity of human existence and makes life together possible and meaningful. It is the good by itself and it does not require any additional explanations (Marin, 2020).

Education always comes with love for valuable things existing in this world and with hope that they will be preserved, protected, and passed further on (Pols & Berding, 2018). The strongest form of this concern today is reflected in repeating the questions of what we mean under the term education, opening a public dialogue on the essential role of education in a modern world facing serious threats and crises of various kinds. It can help us reclaim the original meaning of education as building the unity and relation towards the world worth keeping. Such education should be defended since it is itself worth caring for, and is not solely here for possible political and economic effects. From the standpoint of post-critical pedagogy, we cannot deal with education as some kind of utilitarian entrepreneurial activity, since it is something much more complex than that, and we cannot bring new generations into the world as if into some firm, because the world is so much more than that.

In addition, the history of universities' development has proven that the commitment to solely academic values (academic freedom, autonomy, and collegiality) provides the public with confidence in "the voice of university" on one hand, and the integrity of scientific development on the other (and not only individual academic disciplines relevant for the economy). When science is developed in its own spirit and in line with its own standards, it then provides much greater benefits for the society than by calculation in the context of strategic external goals (Frambach, 2015). Thus understood, science is "the most essential factor of improving society and economy" (Schmidt, 2015, p. 57).

Education is something much broader than "building a career"; it is the way a man/woman "builds himself/herself", in relation to oneself and to the world he/she lives in. It is an attractive goal by itself, and its value cannot be provided only by external incentives. Higher education is necessarily personal and intrinsic, and this is exactly the reason why it cannot be observed solely as the subject matter of impersonal exchange or economic calculation. Due to its complexity and significance for human development, even today we can agree with Kant's claim that education is "the greatest and most difficult problem in front of men (Kanz, 2000, p. 5).

RECONCEPTUALISATION OF MOTIVATION AS AN INVESTMENT IN HIGHER EDUCATION

In accordance with the human capital theory, higher education is comprehended as a form of investment into development of skills, which makes the individuals more productive. More productive individuals, in line with this theory, generate higher salaries and have better prospects of finding and keeping a job (Spring, 2015). This is the reason why higher education is considered to be a profitable investment for individuals and society, analogous to other types of investments whose yields can be calculated. It is expected that future revenues from acquired knowledge and skills will be higher than invested costs (also including the costs of invested time). The factor of time is of special significance in the area of "education production", both in respect of costs and benefits. Acquiring qualifications requires both consuming time and spending money. The benefit of education is also long-lasting and it is measured during a life cycle. Unlike goods, which lose their value over time, the acquired knowledge and skills are equally valuable as long as they are used (Johnes, 1993).

The importance of understanding the technology of skills formation in the life cycle context is emphasized. The technology of human skills formation is linked to two concepts: self-productivity and complementarity (Cunha et al., 2006). Self-productivity refers to the thesis that two key inputs are needed for human capital production. The first one refers to a specific set of basic skills as initial human capital so that more new human capital would be produced. The second input is time as a crucial resource. In order to acquire education, one needs time and engagement; it cannot be purchased as if we are purchasing some goods. The self-productivity concept implies the idea that skills acquired in one period of life persist into future periods. They make the necessary basis for acquiring new skills in later stages of the life cycle. "The first years in life are of critical importance to develop cognitive and non-cognitive skills. Deficits in early development are difficult to catch up at a later stage in life. By contrast, high-quality education, provided early in life, is a stronger foundation for acquiring skills more easily throughout the entire life" (EC, COM 2016, 941, p. 4).

Skills are self-reinforcing. With that reference, the complementarity of investment into skills is accentuated (Carneiro & Heckman, 2003). In order to be efficient, early investments must be followed by later investments. Likewise, later

investment cannot be efficient if they are not preceded by earlier ones. "Acquiring skills is a lifelong process, both formal and informal, and starts very young. The positive long-term effects of good quality early education are significant and well documented, laying the foundation for future ability and motivation to learn" (EC, COM, 2016, 381, p. 4).

In that connection, the motivation for higher education is put in the framework of economic investment calculation of costs and benefits within the life cycle. Since an individual cannot internalize the overall benefit just for himself/herself, in part the benefit flows over to other people and surroundings (e.g., family, friends, business associates, company, local and the broader social community), and the state has an interest to subsidize his/her education on particular levels. In higher education, it is well established that "investment can generate substantial returns for individuals as well as for society at large" (EC, COM 2012, 669, p. 13).

It started from the utilitarian assumption that people act in order to maximize those outcomes which bring the greatest benefit. In that sense, the topic of motivation for education is put into the framework – investment into skills. "As higher education is called on to do more, it becomes more challenging for governments and HEIs to determine the best ways to *target and balance investment*" (EC, COM 2017, 247, p. 9). The incentives for individuals to be included in higher education are of crucial significance, especially for non-traditional students (adult learners, work full-time, immigrants, students from disadvantaged groups etc.).

Investment in higher education and training for skills development is essential to boost growth and competitiveness: skills determine Europe's capacity to increase productivity. In the long-term, "skills can trigger innovation and growth, move production up the value chain, stimulate the concentration of higher level skills in the EU and shape the future labour market" (EC, COM 2012, 669, p. 2). To be able to deliver on the objectives of jobs, growth, investment and competitiveness it is vital to invest in young people. "Providing high-quality education for all is one of the best investments a society can make" (EC, COM 2016, 941, p. 2).

This type of microeconomic theory applied to education is solely individual and it neglects the collective-motivational aspect related to institutional and macro social structures. Actually, it is implicitly assumed that individual patterns of human motivation are responsible for the origin of social structures and institutions, which limit individual choices. Hence, the argument is in force that social structures occur from individual interests, which form the basis of the rational choice theory. The

choice made by each individual is rational when it maximizes personal usefulness and when it is under the influence of external limitations as little as possible. This assumption is called methodological individualism in literature. It is rational to choose a greater benefit over the lesser one, and above all "pursuing one's self-interest without explicit regard to the welfare of others" (Blaug, 2006, p. 229).

On one hand, an individual acquires knowledge as human capital; thus, the responsibility is borne by him/her or his/her guardian in the earliest stages in life to create chances for success. Only individuals are real in the paradigm of methodological individualism; they have their goals and achieve the desired outcomes. On the other hand, the resources are used most efficiently in the conditions of individual freedom of making decisions about the manner for reaching the goal. In that sense, the EU educational policy promotes the idea of free choice of modules, courses, various forms of informal education and training. The procedural state regulations in higher education can cause controversial interpretations from the standpoint of the European educational policy, in the sense of unjustified or excessive limitation of freedom of choice, under the model of the so-called free market. "Well-designed higher education programmes and curricula, centred on students' learning needs, are crucial for effective skills development. A wider range of course choices, including two-year degrees and options for continuous professional development, help higher education respond better to people's needs" (EC, COM 2017, 247, p. 5). Hence a task is set to "provide more transparent information on educational opportunities and outcomes, and tailored guidance to informed study choices and reduce drop-out" (EC, COM 2011, 567, p. 4).

Moreover, individuals are perceived as participants with stable and consistent interests. Any ambivalent, spontaneous, routine behaviour is excluded, as well as the need to critically consider the individual's order of given preferences. Such a postulate in the social sciences is called by John Maurice Clark, an American economist "irrational passion for rational calculations" (Blaug, 2006, p. 231).

The thesis of homogeneity of people as rational participants, who possess the same type of motivation, is tacitly assumed. Analogue to firms in economy, which have similar motives for gaining profit, management principles and even similar technology, human behaviour is predictable and manageable by external incentives. In that sense, success or failure of each individual is interpreted in

comparison to acquired skills independently of the systematic or structural characteristics of the society.

THE STUDENT AS A CONSUMER OF EDUCATIONAL SERVICES: MOTIVATIONAL IMPLICATIONS

Massification of higher education is a significant factor which has exerted influence on positioning the students in the system of higher education, also including the aspect of motivation for education. On a global scale, the enrolment rate at higher education is constantly growing. At the time when the Bologna Declaration was signed, which initiated the structural reforms of the European higher education systems (1999), Gross Tertiary Enrolment Ratio (GTER) for EU was 48% (World Bank, 2022). Worldwide, by the end of the 20th century more than a half of young people from high income countries enrolled in some higher education programme after finishing secondary school. In comparison with the 19th century when around 1% of age cohort enrolled in universities (Ash, 2006; Ringer, 2004), participation has been increased in its entirety. In that respect, the gap is obvious in the participation rate between North America and EU countries, which can be perceived in the period 1971-2014. At the beginning of this period, in 1971, EU countries enrolled 17% of age cohort and the USA 47%. This gap was reflected during the entire period in favour of mostly the USA with certain oscillations in numbers. In 1999, GTER was 48% for Europe and 72% for the USA. In 2014, the data for EU was 68% and 86% for the USA. The latest comparable data are from 2019: 73% for EU and 88% for the USA (World Bank, 2022).

Although it does not have authority over higher education in Member States, EU has found various ways to exert a certain influence on this sector (Keeling, 2006). In the published Communications, EC systematically advocates not only expanding access to higher education for all categories of students but insisting on outcomes or the strategic goal that 40% of young people should complete their tertiary education by 2020. “If efforts are maintained, then the European Union is likely to achieve the headline target of 40% completion of tertiary level education” (EC, COM 2012, 669, p. 11). This request is repeated in almost all analysed Communications.

In order to accomplish this task, it is necessary to reorganize the standard study programmes in the course of learning directed to students' needs. Contrary to the model of standard university education where a programme is linked to a scientific discipline, it insists now on making the link with students' needs for learning. As any client or consumer, a student should have a larger choice of study programmes, various durations, and organization of teaching. With that reference, it is pointed out that: "There is a strong need for flexible, innovative learning approaches and delivery methods to improve quality and relevance while expanding student numbers, to widen participation to diverse groups of learners, and to combat drop-out" (EC, COM 2011, 567, p. 10). In the era of a mass or universal approach to higher education, it is essential to diversify the offer of educational services for the student body, which is no longer homogenous, whether according to capabilities or motivation or professional ambitions. In that sense, "the profile of the population of students entering and completing higher education should reflect wider society" (EC, COM 2017, 247, p. 6).

A debate on participation growth in the higher education system was started by Martin Trow in the 1970s, when he introduced for analytical purposes the model defined by three ideal types: the elite one up to 15% of age cohort participation, the mass one up to 50% of age cohort participation, and the universal one over 50% of age cohort (Marginson, 2016; Trow, 1999). Trow pointed out that the quantitative growth of participation leads also to qualitative changes in higher education systems. The purpose of higher education is changed first – from the education of a small group of young people in the spirit of academic values in the elite system, to the provision of vocational/professional skills for the needs of employing a larger number of people in the mass system. Once again, the purpose is changed when transferring from the mass into the universal system of higher education – in this case, it is reduced to preparing the entire population for social and technological changes, which is reflected in adaptability to changes (Marginson, 2016; Trow, 1973).

According to Trow (Trow, 1973, 1999) the population growth, the role of state regulation, economy expansion, and the growing demand for qualified work are significant driving forces for the growing participation in higher education, but they do not have decisive significance. The key driving force of growing participation is family aspirations for maintaining and improving social positions. This led this author to two conclusions. The first one is that there is no limit on family

aspirations for social advancement through education. There is always going to be a demand to increase the number of places in colleges and universities. Despite the unceasing stories about unemployment of graduate students or excessive offers of educational qualifications, it is clear that persons with higher education increase their prospects to acquire safer, more attractive, and better paid jobs during their lives. The second conclusion is that the emphasis in the universal stage has moved from participation aimed at social promotion to participation as a defence from possible loss of social position. As more people have higher education, it becomes the standard of social status and in a way quasi-compulsory. Those not participating in it have fewer life options. When everybody has a university diploma, the advantages are then reduced, and the pressure increases in relation to the excluded ones.

State policies and state financing have an important role in the expansion of higher education in early stages. It has been shown that, further growth is not necessarily linked to the state's role after the mass system is established by the initial support of the state. Once the mass system is reached, the demand starts to grow spontaneously, and the costs of non-participation become visible, which is helpful for easier financing from private sources.

Since education is conceptualized in EC Communications in line with the human capital theory, a student is observed as a rational participant who is uninterruptedly making choices by selecting alternatives which maximize the benefits, based on available resources. Two types of benefits can be singled out: short-term and long-term. Short-term benefits provide students with the pleasure of attractive lessons, self-fulfilment, and satisfaction during learning. It is defined as the "consumer's aspect of education", significant to boost the demand for education and prevent school drop-out. The long-term benefit is especially valued in the human capital theory programme since it provides students with knowledge and skills, which increase their future productivity in the labour market, thus defining the salary amount. It is defined as the "investment aspect of education", which is especially significant in preserving benefits during a longer period of time (Johnes, 1993). However, an individual is not capable of fully internalizing the benefits only for himself/herself, and the effects overflow to other people and society as a whole. Social prosperity from education (social cohesion, democratization of society, economic growth, poverty rate decrease, etc.) is called "positive externality" in the economics of education. These effects are always indirect, and they represent the

justification for public subsidies for higher education. It is recognized that "modern and effective higher education systems are the foundation of an open, confident and sustainable society (EC, COM 2011, 567, p. 16).

Maximum commitment to studies has been required in the model of standard classical university education. One could not speak of studying as some additional job that can be performed alongside something else. A student is first and foremost the student; it is the most important role and distinguished identity among a multitude of other identities of a young person. Studies at a university implied intensive activity, internally motivated learning, research, libraries, mutual informal activities (Pritchard, 2004). Flexible programmes for study-and-work are sought now in the reforms of higher education supported by EU, simultaneously respecting other obligations of adults enrolled at various programmes of higher education in different stages of life. With that reference, cooperation with employers should increase the relevance of curricula and increase the possibility for students to gain work experience and learn through work. Flexible study options (blended or entirely via the internet) and broader acknowledgement of earlier learning are the imperatives, so that higher educations would be more inclusive – especially to adults. Higher education has a duty "to ensure that content is up-to-date, provide relevant study programmes in fields where skills shortages exist and develop methods of learning and teaching that allow students to acquire the breadth and depth of skills they need" (EC, COM 2017, 247, p. 4-5).

The greater variety of student population makes teaching more complex. Professors must be well-prepared and enabled to work with students of different backgrounds, expectations and needs. In that sense, pedagogical training of teachers is required in higher education, exchange of good teaching practices, implementation of pedagogical innovations in teaching, as well as rewarding high-quality teaching. To increase "the prestige and rewards associated with good teaching, some have introduced new forms of teaching fellowship and frameworks for teaching excellence" (EC, COM 2017, 247, p. 9).

In addition, higher education institutions must understand the trends in the labour market, collect and publish information on how fast their students find jobs, and adjust their programmes accordingly. This information is necessary for students and their families in order to make informed decisions on what and where to study. Adjusting curricula is a long and complex activity. There should be more comparable information on outcomes in the labour market and more

opportunities to acknowledge non-formal and informal learning. It is important that very institutions or providers of higher education may choose their mission and profile their educational offer in line with the market needs of students as customers of educational services.

CONCLUSION

Based on the contents of analysed EC Communications from a pedagogical point of view, it can be definitely concluded that the problem of motivation for higher education is being reconceptualised in a threefold sense in accordance with the economic agenda. Firstly, the intrinsic value of education as a pedagogical term is neglected. The very purpose of education as a pedagogical concept is changed by instrumentalising the value of education to external purposes, such as economic growth, productivity, searching and keeping a job in the labour market. From a pedagogical standpoint, external side effects linked to economic, political and other social goals may become the focus of the entire higher education system without relying on intrinsic, ontologically relevant aspects of education for the development of human beings in the broadest sense. This not only reduces the term of education to economically profitable aspects but also implicitly normalizes the image of the world as one big firm where people compete for their positions. Secondly, the problem of motivation for education is reduced to investment into skills as the human capital making individuals more productive during their life. By doing that, the multidimensionality and complexity of motivation for education is reduced to the dimension of economic calculation, which is important but not the sole dimension. Thirdly, in such a model students are positioned as rational consumers of educational services, who pass decisions and select educational programmes in line with their preferences and needs. With that reference, the scientific discipline or pedagogically valuable content of education is no longer in focus but the needs of customers that must be satisfied.

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CHALLENGES FOR RESEARCH ON TEACHER MOTIVATION AND EMOTION

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Abstract. In this chapter we address the importance of teachers' emotions and motivation for their own instruction and their students' learning and development. We note that there are large gaps in the field's understanding of teacher motivation and emotion, especially those that involve the how, when, and why of these constructs. We argue that a central reason for these knowledge gaps is that much of the extant research is not well aligned with the central characteristics of the constructs. In particular, individuals' motivation and emotion vary considerably by context (e.g., location, day, topic, other people, other events); however, this multi-faceted variability is rarely considered. Indeed, variability is often removed, either during the measurement or analysis stage, or both. After discussing these conceptual and methodological issues, we suggest directions for future research that will increase understanding of important issues.

Keywords: motivation, emotion, teachers, context.

CHALLENGES FOR RESEARCH ON TEACHER MOTIVATION AND EMOTION

Teaching is a difficult career. To be successful, teachers need knowledge – of content, pedagogy (i.e., how to teach), and pedagogical content knowledge (i.e., how to teach specific content). However, motivation and positive emotions are also crucial; together they fuel effort, perseverance, and high-quality interactions with students that together maximize students' opportunities to learn. When teacher knowledge, motivation, or positive emotions are low, it is less likely that instruction

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will be effective. Therefore, it is important that, at minimum, teachers' knowledge is current and their motivation and positive emotions are high and sustained.

The importance of teacher knowledge is widely acknowledged by researchers and a variety of stakeholders (e.g., parents, school administrators, policy makers). Correspondingly, there are generally many opportunities for teachers at all stages of their career to increase their knowledge, such as through workshops, advanced education courses, and mentoring programs.

Compared to research about teachers' knowledge, much less is known about their emotion and motivation, although research about the latter has grown considerably during the past decade. Developments include identifying new constructs that are relevant for teachers (e.g., relational goals; Butler, 2012), creating new measures within existing motivation theories (e.g., Watt & Richardson, 2007), and identifying associations of teacher motivation and emotion with other teacher and student variables (e.g., Pelletier & Rocchi, 2016). Nevertheless, the growth in knowledge is quite uneven. As we discuss in this chapter, one reason for this situation is that, typically, research about teacher motivation and emotion does not align well with the constructs' central characteristics. Before presenting our argument, however, we begin with a brief outline of central characteristics of motivation and emotion and follow with an overview of research with teachers.

CHARACTERISTICS OF MOTIVATION AND EMOTION

Although motivation and emotion are often considered separately, they are highly inter-related and partially overlapping constructs (Pekrun, 2021). For example, interest is both a cognition or belief that directs and motivates behavior, and an emotion. Emotions such as enjoyment, excitement, and enthusiasm are motivating; they can promote persistence and deep engagement. However, these same emotions can also stem from the motivation that arises from wanting to understand a topic (i.e., mastery orientation or growth mindset; Patrick & Kaplan, 2022).

A review of theories of motivation and emotion is beyond the scope of this chapter, but we outline their central features. More details can be found in the many excellent reviews about motivation and emotion in general (e.g., Chen & Cheng, 2022; Kaplan & Patrick, 2016; Pekrun, 2006; Wigfield et al., 2015) and about

teachers specifically (e.g., Lauermann & Butler, 2021a; Lazarides & Schiefele, 2021; Pelletier & Rocchi, 2016; Richardson et al., 2014; Sutton & Harper, 2009).

Motivation and Emotion are Inferred from Behavior

Both motivation and emotion are internal and therefore not directly observable, but they can be inferred from people's behavior and physiology. Motivation is indicated by a combination of time spent, effort expended, quality of engagement, choice of tasks, positive responses to challenges, enjoyment, and perseverance despite difficulty or set-backs (Schunk et al., 2014). Emotions are typically accompanied by physical signs (e.g., facial and vocal expressions, gestures) and physiological indicators (e.g., increased heart rate or blood pressure, muscle tension, lethargy). Often, however, felt emotion and the accompanying visible signs do not match (Saarni et al., 2008); this lack of correspondence may be intentional or unintentional. Nevertheless, people can, and do, make assumptions, even unconsciously, about someone's motivation and emotion based on external indicators. Furthermore, these perceptions of others typically affect one's own emotion, motivation, and behavior (Frenzel et al., 2021; Sutton & Wheatley, 2003).

Motivation and Emotion Reflect Subjective Perceptions

Both motivation and emotion reflect peoples' perceptions – even ones they are not consciously aware of – about themselves and their environment (Wigfield et al., 2015). Importantly, perceptions are subjective, therefore they do not necessarily correspond to an "objective reality." Nevertheless, these interpretations shape motivation-related beliefs (e.g., about competence or efficacy, task value, attributions for past performance) that provide psychological explanations for behavior. Explanations may answer questions such as: Can I be successful? Do I want to be successful? Why do I want to be successful? What will it cost me? and why was I successful (or not) in the past? (Wigfield et al., 2015).

Emotions also involve interpretations, either conscious or unconscious, about the significance or relevance of an event or situation to one's goals, beliefs, or standards (Frenzel et al., 2020; Schutz et al., 2006). Therefore, people experiencing the same event may feel different emotions, because both their perceptions, and the implications of the perceptions for their goals, typically vary.

For example, a teacher may feel disappointment in not meeting his expectations of being well-prepared for a lesson, or pride that his students showed initiative and self-regulation despite the lesson having little instructional structure because it was not planned well.

Motivation and Emotion Vary by Context

Although people have general motivational and emotional tendencies, their motivation and emotion vary considerably across different contexts or situations. The contextual sensitivity of motivation and emotion may even lead to responses that are unexpected and quite uncharacteristic for the person (e.g., Hargreaves, 2001; Itzkovich & Dolev, 2021). These atypical responses may be momentary and isolated, or become habitual in a specific situation, depending on reactions from others and oneself.

In addition to physical features, contexts include social factors (e.g., the nature of interactions, relationships, and power dynamics), culture (e.g., norms, values, systems of meaning), and time periods (Schutz et al., 2006). For example, how a teacher feels (e.g., overjoyed, angry, anxious) and responds (e.g., answering thoughtfully, chastising, ignoring) when a student interrupts to ask a question during a lesson may be influenced by numerous details. Just a few of the many contextual factors that may frame how a teacher responds to the interruption include the following:

- the implication of the question (e.g., shows the student is thinking deeply or was not paying attention);
- the teacher's objectives for the lesson (e.g., finish the chapter quickly or deepen students' understanding) and for students (e.g., increase their participation or that they stay focused on the task at hand);
- the student's performance or demeanor (e.g., usually disengaged but now showing interest or is consistently abrasive);
- implications of not finishing the lesson (e.g., students' test scores are jeopardized or no negative effect);
- the teacher's knowledge of the content (e.g., minimal or extensive);
- the perceived importance of the topic or content area (e.g., crucial or not);
- the parents' history of communication with school personnel (e.g., previous complaints);

- how fellow teachers talk about their students (e.g., dismissively or warmly); and
- current local or national policies (e.g., whether teachers face sanctions if they talk to students about the topic).

We return to these characteristics of motivation and emotion in subsequent sections. Next, however, we present a brief overview of research about teacher motivation and emotion.

RESEARCH ON TEACHER MOTIVATION AND EMOTION

Interest in teacher motivation and, to a lesser extent, emotion has grown considerably during the past decade, and they are now flourishing areas of inquiry. In general, this activity mirrors the long history of research about students. That is, the interest in connecting student motivation and emotion to their engagement and achievement was extended to include teachers as antecedents of student motivation, emotion, and achievement. Furthermore, the prominence of survey research with students was continued with teachers.

Research is typically based on theoretical premises that teacher motivation and emotion influence students' outcomes indirectly, through their instructional practices and relationships with students. That is, teachers' motivation and emotion influence how they teach and interact with students, and how their instruction is perceived by students, which then affect students' motivation and ultimately their achievement (Bardach & Klassen, 2021; Lauermann & Butler, 2021b; Pelletier & Rocchi, 2016). There is now a wealth of correlational research supporting these hypothesized connections between teacher and student motivation. For example, teachers' motivation or motivation-related beliefs (e.g., self-efficacy, perceived autonomy, desire to impress others) and emotion (e.g., enthusiasm, anxiety) are associated significantly with students' perceptions of teacher instruction and with student motivation and emotion (e.g., Ahn et al., 2021; Butler & Shibaz, 2014; Frenzel et al., 2009). Furthermore, these associations are reciprocal, so that student motivation and emotion also predict subsequent teacher motivation and emotion (Frenzel et al., 2018).

Despite the accumulation of research about teachers' motivation and emotion, several crucial issues have received little attention, particularly those that involve the

"how" and "why." We argue that a major reason is the general misalignment between the research methodology used and the central characteristics of the constructs.

THE MISALIGNMENT BETWEEN CHARACTERISTICS OF MOTIVATION AND EMOTION AND RESEARCH WITH TEACHERS

As we noted, motivation and emotion are inferred from behavior, involve subjective perceptions, and vary across situations. It follows then, that these characteristics should also be central to research about motivation and emotion in general, including research with teachers. This is often not the case, however.

The reason for the misalignment between research and characteristics of the constructs investigated, we believe, is the methodology researchers typically use. Researchers studying teacher motivation and emotion have relied predominantly on self-report surveys, whereby teachers, or students, rate general aspects of teachers' motivation or emotion on a set of items using a numerical scale (e.g., from 1-5 or "strongly agree" to "strongly disagree"). Items do not usually ask about a specific day or activity; rather, raters may average their views across occasions or think about the most recent occasion or the most memorable. Therefore, surveys generally afford little sensitivity to context, and so are not consistent with the central characteristics of motivation and emotion we discussed previously.

In contrast to how they are measured, people's motivation and emotion are highly variable across time and contexts (e.g., Schmidt et al., 2007). Indeed, we know little about how people decide on their ratings (although see Koskey et al., 2010; Patrick & Ryan, 2008). Interpreting results from surveys is therefore inherently problematic because the ratings may not apply to any particular situation. Furthermore, because ratings are typically aggregated across people, the results may not apply to any particular person. These features of survey research limit what can be learned from the results.

The inherent subjectivity of motivation and emotion – before, during, and after the experience – also obstructs the interpretation of survey data. For example, teachers may encounter quite similar situations while teaching a lesson but experience very different motivational or emotional responses (Durr et al., 2014). Therefore, analyzing numerical ratings tells us little about *what* teachers actually experience and *how* individual teachers perceive and respond to these experiences.

People infer someone's motivation and emotion from their behavior, and these inferences or perceptions are subjective. Consequently, the agreement among people about someone's thoughts or feelings, based on their behavioral cues, is typically modest. This is illustrated by the consistent finding of considerable variability within classrooms in students' perceptions of the same teacher's emotion (Frenzel et al., 2009), motivation (Miller & Murdock, 2007), and instructional practices (Bardach et al., 2018; Domen et al., 2020). These findings indicate that making accurate inferences about someone's motivation or emotion is not straightforward. When forming their perceptions of a teacher, students may differ among themselves in the types of teacher behaviors they attend to, and students may interpret the same behaviors differently. For example, middle school students differed in how they interpreted their math teacher's practice of grading homework for completion rather than correctness; some students perceived it as showing their teacher wanted them to learn and understand the math, whereas others saw it as an indication that the teacher did not care about their learning (Patrick & Ryan, 2008). Regardless, the common practice of measuring aspects of teachers' motivation or emotion by aggregating student ratings of their teacher is problematic, because the average score may not represent any one student's perceptions.

In summary, there are many, many overlapping features that may contribute to teachers' experiences of motivation and emotion, and these features involve myriad systems at different levels of proximity. However, our typical survey methods of researching teacher motivation and emotion do not reflect teachers' "messy" reality, and therefore limit our understanding of the concepts. We argue, therefore, that researchers will learn more about *how*, *when*, and *why* teachers' thoughts, emotions, and behavior manifest and change in various situations and over time when they attend to specific contexts within which those teachers work. We discuss alternative approaches to measuring teacher motivation and emotion that have provided more contextual information next.

MEASURING CONTEXTS OF TEACHER MOTIVATION AND EMOTION

Researchers' conceptual frameworks guide the types of data they collect. Some researchers (e.g., Kaplan & Garner, 2018; Turner & Patrick, 2008) have argued that the predominant quantitative studies, which are framed in traditional motivation

theories and which identify unidirectional, linear main effects of distinct factors or independent associations among a small number of constructs, are not compatible with the nature of complex contexts such as classrooms and schools. Instead, rich qualitative data collected over time are necessary to understand the interplay among various, overlapping features of teachers' (and others') experiences. In line with this position, theoretical frameworks other than the dominant social cognitive models have been used to investigate teacher motivation and emotion. These include Bronfenbrenner's ecological systems model (e.g., Cross & Hong, 2012), Kaplan and Garner's dynamic systems model (e.g., Hathcock et al., 2020), Rogoff's three planes of analysis framework (Patrick & Mantzicopoulos, 2015), and Holland's figured worlds (e.g., Nolen et al., 2014). These models or frameworks are situated, whereby people are studied holistically, dynamically, and without separating them from the contexts they participate in.

A small number of researchers of teacher motivation and emotion have used other methods to document contextual information. One approach is the experience-sampling method (ESM; Schmidt et al., 2007), also called ecological momentary assessment (EMA; Liu et al., 2019). The ESM involves people rating specific moments in time on multiple occasions within a short time period, while adding concurrent contextual details. Although it still has features of typical survey methodology, the repeated measurement of specific events with some descriptive narrative enables greater understanding of the results. For example, Malmberg et al. (2014) used ESM to study variability in high school teachers' feelings of accomplishment or mastery throughout a two-week period. The teachers tended to report feeling more successful when their lessons involved introducing a new topic or revision, compared with lessons that involved students.

Survey ratings are typically enriched when they are accompanied by qualitative data, where people elaborate on their experiences and interpretations in their own words with open-ended responses. In one example, researchers used a combination of teacher diaries and survey questions to examine teachers' emotional exhaustion. Each evening over a two-week period teachers wrote about their positive and negative events at work that day, before rating their emotional exhaustion for the same day. Therefore, teachers provided both an account of the day's events and the associated personal meanings of the events, which could assist the researchers' understanding of the quantitative emotion data (Schmidt et al., 2017). In a similar approach, albeit with a broader focus, Bergey et al. (2019)

asked preservice teachers to write about the barriers and drawbacks of becoming a teacher, before having them rate their perceptions of the teaching profession and possible costs of being a teacher.

Teacher motivation and emotion have also been investigated solely with qualitative data, and often multiple types. For example, Turner et al. (2011) conducted semi-structured interviews, classroom observations, and post-observation interviews with teachers throughout a year-long teacher-initiated collaboration to develop their motivation-promoting instruction. These data enabled researchers to understand how, or if, teachers' motivational beliefs and practices changed throughout the year, and why. In another example, retrospective interviews with experienced teachers were supplemented with an analysis of policy documents and newspaper articles covering the time periods the teachers spoke about (Tsang, 2020). Stimulated recall (Lyle, 2003) is another useful method for learning about teachers' motivation and emotion. With this method a teacher watches a recently-recorded lesson, or lesson clips of selected events, with a researcher and answers questions about specific moments in the recording, such as why they reacted in a particular way or what they were thinking at the time. Stimulated recall provided new insights about teachers' emotions associated with their mathematics instruction (Francis et al., 2020).

With the use of methods such as those just discussed, researchers are able to address important questions that have received little attention to date. We give some examples of some of these questions next.

DIRECTIONS FOR FUTURE RESEARCH ABOUT THE "HOW" AND "WHY" OF TEACHERS' MOTIVATION AND EMOTION

Teachers' motivation and emotion are not static, either from day-to-day or across their careers. We know little, however, about the processes of teachers' change and the circumstances with which different kinds of changes occur. These include when and why teachers' motivation and emotion manifest in particular situations, and when, why, and how they change over time. We offer just a few of the many questions that need researchers' attention.

Even though teachers usually begin their career highly motivated and optimistic (Watt et al., 2012), the many inherent, daily challenges that teachers face

may "chip away" at that motivation and positivity. It would be useful to understand why some teachers experience decreased motivation and increased negative emotions and others do not. Other questions include: How are some teachers' motivation and positive emotion sustained? How do different motivational and affective processes and trajectories play out and in what circumstances? How can declining teacher motivation be reversed?

Quantitative studies document high levels of teacher dissatisfaction, intent to leave the profession, and attrition world-wide. For example, more than half of teachers in the United States (PDK Poll, 2019), Finland (Räsänen et al., 2020), and Australia (Carroll et al., 2022) reported they were seriously considering leaving their job. Survey-based studies have identified a range of factors related to teacher dissatisfaction and career exit, including work pressure, student behavior, and low pay. Research to flesh out the statistics could address questions such as the following: How do teachers decide whether or not to leave? Are there critical moments in teachers' careers when they are more vulnerable to experiencing negative changes in their motivation and emotion? If so, what do these occasions look like?

In many countries teachers report that they do not feel valued or respected. Almost one third of teachers from countries participating in the 2013 Teaching and Learning International Survey (TALIS – OECD, 2014) reported feeling that their work was not valued. Why do teachers perceive they are not valued? What do other people (e.g., school principals, parents) do that communicate to teachers they are valued? Compensation is often considered an indicator of value, and teachers in many countries are not well-paid. In the United States, teachers have lower incomes than people with comparable education in other jobs (PDK Poll, 2019). How do teachers coordinate their own value of the work they do and their profession in general with a perception that society in general does not value them? What role do motivational and emotional regulation strategies play?

Teachers typically report a high degree of stress, and pressures from many sources, which are associated with their motivation for teaching (Pelletier et al., 2002). More elaborated, contextually-specific accounts of teachers' pressures would enhance understanding and allow for them to be addressed productively, including encouraging procedural and policy-level changes. More research is also needed to document how teachers negotiate the various stressors in ways that do not compromise their motivation and emotion.

Teacher burnout, characterized by emotional exhaustion, depersonalization or unresponsiveness to others' needs, and feelings of low accomplishment, is a serious and not uncommon problem associated with prolonged occupational stress. It predicts mental health illnesses in addition to absences and leaving the profession. Quantitative research has identified types of stressors associated with burnout, including workload, time pressures, class size, disruptive or unmotivated students, discrepancy between one's own and colleagues' values, inadequate support from school leaders, and low autonomy (Carroll et al., 2022; Fernet et al., 2012; Skaalvik & Skaalvik, 2010, 2017). Also, a positive school climate is associated with less teacher attrition and burnout (Yang et al., 2022). While informative, filling in details about those findings with rich qualitative descriptions will aid efforts to reduce teacher burnout. Questions that need addressing include the following: How do teachers regulate their motivation and emotions so they do not become burned out? How can schools and school personnel support teachers so they don't experience burnout? How are positive school climates developed and sustained? How do teachers who feel burned out become reinvigorated and re-engage as effective teachers? What supports are necessary for this to happen? What does administrator support look like in different contexts?

One ubiquitous and serious factor associated with teacher stress, and subsequent burnout and career exit, is violence directed at teachers. In a recent Canadian study, 54% of teachers reported physical violence from students and 72% experienced verbal abuse and harassment (Santor et al., 2021). Violence towards teachers is a similar concern in many other countries, including Australia (Burns et al., 2020), China (Yang et al., 2019), Slovakia (Dzuka & Dalbert, 2007), South Africa (Woudstra et al., 2018), and the United States (McMahon et al., 2022; Moon & McCluskey, 2020). Research on understanding how to best prevent school violence, and support teachers when it occurs, is needed. In a recent study teachers gave suggestions, via written open-ended questions, for ways that schools, communities, and society could prevent and respond better to teacher-targeted violence (McMahon et al., 2020). A next step is to trial enacting these, and other, strategies to identify which are best-suited to different situations, and how they can be implemented.

Because teaching is typically an emotionally challenging occupation, it is important to consider how teacher education programs can best prepare future teachers for managing situations that may undermine their positive emotion and

motivation. This need is highlighted by Richardson and Watt's (2014) finding that highly idealistic pre-service teachers are particularly vulnerable for becoming disillusioned early in their career. Specifically, the preservice teachers who were most motivated by the intrinsic and social values of teaching (e.g., affecting children's futures) tended to report lower career satisfaction, self-efficacy, and intention to remain a teacher compared to new teachers with different preservice motivational profiles. Questions such as the following are important to address: How can teacher education programs prepare their graduates emotionally and motivationally for the realities of the job, so that initial enthusiasm and idealism are not risk factors for attrition? Although teacher education programs often want their graduates to have high self-efficacy for teaching, how can they foster high-but-realistic self-efficacy (see Wheatley, 2005)?

Teachers' work is affected significantly by educational policies. In the United States, policies that regulate teachers' activities have become highly controlling. For example, in some districts teachers are expected to use scripted, "teacher-proof" curricula, whereby lesson content is explained by commercial videos or text that teachers read from a teachers' manual. Another example is where districts establish standardized schedules, whereby all same-grade teachers are required to teach lessons from the same page of a textbook on the same day (e.g., Olsen & Sexton, 2009). Such policies were developed in response to low confidence in teachers' ability to make their own instructional decisions. Currently, state governments and local school districts are adopting or preparing to adopt restrictions to topics teachers may talk to students about, such as effects of historical racial injustice or sexual orientation. Such policies may well affect teachers' motivation and emotions; it will be important to document how new restrictive or prescriptive policies affect teachers' motivation and emotion and what the consequences are for teachers, students, and communities.

SUMMARY

We noted that much has been learned about teacher motivation and emotion. However, the quantitative methods that have been used primarily have limited researchers' understanding of many crucial questions. These involve, particularly, questions about variability and change in teachers' motivation and emotion and

the personal, subjective nature of these constructs. We concluded this chapter by suggesting many directions for future research and look forward to following new research that addresses such questions.

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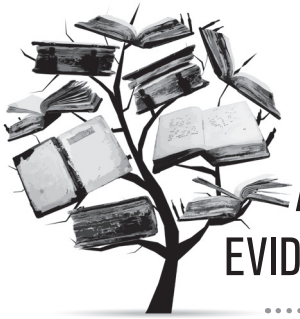

PARENT MOTIVATIONAL BELIEFS, STUDENT MOTIVATION, AND LEARNING OUTCOMES: THEORY, EVIDENCE, AND IMPLICATIONS FOR PRACTICE

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Abstract. Parents' motivational beliefs have been significantly associated with students' achievement, motivation, engagement, and learning. Drawing from several contemporary motivational theories, the chapter focuses on parents' motivational beliefs such as parents' implicit theories of intelligence, their achievement goals, efficacy beliefs and expectancies for success for their child in relation to children's achievement motivation, engagement, and learning outcomes. Practical recommendations for parents in their interaction with their children are delineated and the contribution of school-family partnership to children's academic outcomes is pointed out.

Keywords: parent motivational beliefs, mindsets, achievement goals, efficacy beliefs, learning outcomes.

Achievement motivation theory and research have been associated with implications for practice within the school context regarding students, teachers, and school professionals. The impact that motivation theory and research have on parents and their involvement in children's learning is less examined, although the role of parents in children's motivational beliefs has been acknowledged during the last decades (e.g., Barger et al., 2019; Grolnick & Pomerantz, 2022; Lazarides et al., 2015; Pomerantz & Grolnick, 2017; Simpkins et al., 2015). As Pomerantz and Grolnick (2017) have pointed out, excluding parents from our conceptualizations of children's motivation makes our efforts to promote their motivation and competence less successful. Moreover, understanding parents' contribution to children's motivational beliefs, engagement, and persistence towards goal

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attainment, as well as working with parents to strengthen their supportive role for children, is particularly important during these challenging times of global change and uncertainty (Lerkkanen & Pakarinen, 2019). New and unexpected changes, like the COVID-19 pandemic or recent and current socioeconomic downturns and instability, have set new challenges not only for education, but also for families in relation to how parents raise their children, how they develop their own beliefs and values about school learning and education, and how they communicate their beliefs and values to their children.

The present chapter will focus on how parent motivational beliefs are associated with student achievement motivation, engagement, and learning outcomes and how this theory and evidence can inform parents, teachers, and counsellors working with elementary and secondary school students. Although motivational theories have underscored different parental beliefs and their role in children's motivation and achievement-related behaviors, collectively they have shown relatively consistent associations between them, either directly or indirectly, via parental practices (e.g., Pomerantz & Grolnick, 2017; Simpkins et al., 2015). These relationships constitute complex, diverse pathways that unfold along with development and can explain individual differences, to a large extent. The significance of parents' motivation for their children's motivation, learning and achievement has been supported even during developmental periods, when students strive for their autonomy, such as adolescence. Due to space limitations, this chapter will focus on the following parental beliefs: implicit theories of intelligence or mindsets about the malleability of intelligence, parent goals for their child's achievement, and parent beliefs about the child's academic efficacy and expectations for success.

PARENTS' IMPLICIT THEORIES OF INTELLIGENCE/MINDSETS: GROWTH VS. FIXED

Dweck's social-cognitive theory about the nature of ability (Dweck, 1999, 2006) distinguishes between two types of implicit theories or mindsets: the entity theory, or fixed mindset, and the incremental theory, or growth mindset. According to the first, intelligence and abilities are viewed as innate and resistant to change, whereas the second type of theory views intelligence and abilities as malleable, incremental, and dependent on effort and practice. The two mindsets represent

broader meaning systems that people develop to understand and function in achievement situations (Dweck & Molden, 2017). The growth mindset has been associated with adaptive cognitive, motivational, emotional and behavioral patterns of learning such as strategy use, mastery goals, positive affect, persistence, self-regulation, and achievement. The fixed mindset has been associated with maladaptive learning patterns, such as non-effective or absence of strategy use, performance goals, negative affect, and low persistence. This is particularly true in challenging situations that entity theorists perceive as threatening, whereas incremental theorists view them as opportunities to learn and develop (e.g., Burnette et al., 2013; Costa & Faria, 2018).

Implicit theories/mindsets have been extensively examined in relation to learners. Until recently, few studies examined parents' beliefs about the fixed or malleable nature of their child's abilities. When parents hold an entity mindset for their child, they believe that the child has been born with a certain amount of intelligence that cannot change. Conversely, parents holding a growth mindset believe that their child's abilities develop with effort and persistence. Thus, when a child performs poorly, an entity-theorist parent interprets it as a permanent deficit that cannot improve. An incremental theorist, however, interprets it as an opportunity for personal growth via effort expenditure. Consequently, parent involvement may also differ, with entity theorists more likely to engage in unconstructive involvement (e.g., performance-oriented teaching, controlling behavior, negative affect) and incremental theorists more likely to demonstrate constructive involvement (e.g., mastery-oriented teaching, autonomy support, positive affect, less homework-related conflict). These findings have been supported by both experimental studies (Moorman & Pomerantz, 2010) and surveys with hypothetical vignettes (Matthes & Stoeger, 2018; Muenks et al., 2015). Moreover, parental mindsets predict children's mindsets about their own academic abilities; parent endorsement of the growth mindset is associated with children's growth mindset and, in turn, with adaptive learning processes (Matthes & Stoeger, 2018). Furthermore, congruence between maternal and paternal incremental theories of intelligence constitutes a consistent and positive family context for the child from a motivational point of view, whereas congruence between parents' entity theories may turn out to be harmful for the child (Jiang et al., 2020).

The above findings have important practical implications for parents during their everyday interaction with their children. Parents may communicate their mindsets

to their children via praise and criticism, as well as via their beliefs and reactions to success and failure (Dweck & Molden, 2017). By endorsing the growth mindset, parents (a) provide messages about the malleability of abilities, (b) emphasize the personal control over them via effort and persistence, (c) contribute to the adoption of the growth mindset by the children themselves, and (d) get involved in their children's schoolwork in constructive ways. Each of the above is particularly important for demanding and challenging tasks, which gradually increase as children grow up and advance in school grades. Furthermore, it's important that parents communicate with each other about their general beliefs regarding the malleability or fixedness of intelligence and try to adopt congruent incremental beliefs (Jiang et al., 2019).

PARENT ACHIEVEMENT GOALS FOR CHILDREN: MASTERY VS. PERFORMANCE

Achievement goal theory (AGT) has been among the predominant achievement motivation theories in the educational context during the last decades (Urdan & Kaplan, 2020; Elliot & Hulleman, 2017). According to AGT, the adoption of different achievement goals is associated with different learning processes and outcomes (for a review, see Elliot & Hulleman, 2017).[1] In general, mastery-oriented students – students who are engaged in an achievement situation because they wish to understand, acquire new knowledge, and develop skills – are more likely to have adaptive cognitive, affective, and behavioral patterns of learning (e.g., strategy use, help seeking, effort expenditure, persistence, preference for challenging tasks, positive attitude towards school). In contrast, performance-avoidance-oriented students – students who are engaged in an achievement activity to avoid negative judgements from others and a demonstration of lack of ability – are more likely to show maladaptive learning patterns (e.g., fear of failure, high anxiety, avoidance of help seeking, poor strategy use, preference for easy tasks and avoidance of challenging ones). The evidence for performance-approach goals is less consistent, with some studies showing associations with positive outcomes (e.g., academic achievement), some others showing associations with negative

1 There have been several AGT developments addressing important conceptual issues, such as the 2×2 model, the 3×2 model and the reconceptualization of achievement goals as "aims" rather than "orientations," which, however, are beyond the scope of the present article. For a detailed review about these significant revisions, please see Elliot & Hulleman (2017) and Urdan & Kaplan (2020).

outcomes (e.g., avoidance of help seeking, test anxiety), and studies indicating no significant associations with learning outcomes (Anderman, 2020; Midgley et al., 2001; Urdan & Kaplan, 2020).

As a social-cognitive theory, AGT has emphasized the role of the context in shaping a student's achievement goal orientation. Although emphasis has been assigned to the school context and the achievement-related messages students receive from their educators and peers, the family context is acknowledged as one that provides meaningful competence-related experiences. Following the fundamental theoretical premises, the emphasis parents assign to mastery or performance for their children and the respective messages children perceive from their parents constitute significant predictors of children's personal achievement goals, learning behaviors, and outcomes. Specifically, when students perceive an emphasis by their parents on learning, knowledge acquisition, and skill development, and they receive messages that mistakes are part of the learning process, they are more likely to espouse mastery goals, whereas they are more likely to espouse performance goals (approach or avoidance) when they perceive a parent emphasis on school grades, social comparisons with classmates, and avoidance of failure. This predictive function of perceived parent goals was confirmed in a study with three age groups of adolescents (junior high, middle high, and senior high school) indicating that, despite adolescents' strivings for autonomy, formal and informal parent messages about school learning, success, and failure are still significant to students' own personal motivational beliefs (Gonida et al., 2007). Moreover, perceived parent mastery goals have been found to consistently predict, via students' own mastery goals, behavioral (e.g., attention, effort, persistence) and emotional (e.g., enjoyment, less anxiety, less boredom) engagement in schoolwork, academic self-efficacy, coping strategies in mathematics, perceived help-seeking benefits and intentions to seek help, and fewer perceived costs and intentions to avoid seeking help (Gonida et al., 2009; Gonida et al., 2014; Friedel et al., 2007, 2010). It should also be noted that when perceived parent goals were co-examined with perceived school goal structures or teachers' goals, students' perceptions of their parent's goals toward mastery or performance were stronger predictors than school or teacher goals (Gonida et al., 2009; Friedel at al., 2007, 2010).

Additionally, empirical evidence indicated the critical role of a parent's achievement goalsfor their child in their own practices related to their child's

education (Gonida & Cortina, 2014; Mageau et al., 2016; Pomerantz et al., 2006). Specifically, it has been found that mothers who had high performance goals for their adolescents, particularly aiming for them to achieve higher than their classmates, tended to put more pressure on their children to succeed. The more mothers reported high performance goals and the less they reported mastery goals for their children, the more their children perceived instances of controlling parenting, guilt induction, and lower acknowledgment of their feelings (Mageau et al., 2016). Similarly, during primary and high school years, performance-oriented parents tended to worry about their child's school grades and to adopt more controlling homework practices, such as pressuring the child to do the homework, continuously monitoring, and checking work for mistakes, in order to ensure their child's good performance. In contrast, autonomy-supportive parents were more likely to support their child's autonomous motivation, self-regulated learning during homework and to provide constructive help, if needed (e.g., facilitating hints, encouraging self-monitoring and self-evaluation). They also tended to avoid over-involvement in homework and intrusive practices such as doing the homework themselves and shifting the control of learning and schoolwork from the child to themselves, preventing their own and the child's negative affect increase (Falanga et al., 2022; Moè et al., 2018). These results were confirmed for late primary school in relation to math homework (Falanga et al., 2022) and for both primary and junior high school in relation to homework in general (Gonida & Cortina, 2014).

The above evidence shows that parents' emphasis should be on knowledge acquisition and skill development for their children and not on high grades as a mean to demonstrate competence to others or to avoid negative judgments by others. Thus, children would be more likely to receive consistent messages from their parents that schoolwork and learning experiences contribute to their knowledge and skill acquisition, effort and personal work are required to develop competence, mistakes are part of the learning process, and failure does not constitute a threat to their competence. Parents require a meaning system whereby school success is defined in relation to interest, effort expenditure, and personal growth. Such a meaning system would dissuade them from overcontrolling while assisting their children with homework (Falanga et al., 2022; Gonida& Cortina, 2014). Instead, they would be more likely to support their children's school-related work and to promote their self-regulated learning skills. Further, less parent emphasis on competition and social comparison with others (e.g., siblings, classmates), either

via messages or practices in relation to schoolwork, would encourage children's self-development. This does not mean, however, that parents should undervalue school grades or exam scores, especially in contexts where they have significant consequences for a child's educational and career choices. Endorsing mastery goals while acknowledging the impact of school grades and exam scores on students' future goals might be more realistic and better aligned to students' academic concerns (Urdan, 2003).

SELF-EFFICACY BELIEFS AND EXPECTANCIES FOR SUCCESS: THE PARENT'S ROLE

Bandura's social-cognitive theory has emphasized self-efficacy as a key concept in human functioning. It is defined as an individual's belief in their own capabilities to achieve designated levels of performance in relation to specific tasks (Bandura, 1997, 2001). Bandura (e.g, 1991, 2001) has emphasized the agentic role of student self-efficacy beliefs for learning, motivation, self-regulation, and, ultimately, achievement. Students who believe in their capability to perform well in a specific set of tasks are more likely to initiate involvement in the tasks, engage effectively in them, persist despite challenges, and, in turn, increase the likelihood of high performance. Conversely, students who don't trust their capabilities to achieve desired outcomes in specific activities are less likely to choose the activities, employ effective strategies, or persist when faced with difficulties, resulting in a lower likelihood of attaining the designated levels of performance (e.g., Schunck & DiBenedetto, 2016, 2020; Usher & Schunck, 2018). Empirical evidence has demonstrated that self-efficacy is a significant predictor of several student academic outcomes, such as academic choices, effort expenditure, persistence in the face of difficulties, and performance (Pajares, 1996; Lee et al., 2021).

Similarly, the expectancy–value theory (EVT), or situated expectancy–value theory (SEVT), by Eccles and Wigfield (e.g., Eccles & Wigfield, 2020; Wigfield & Eccles, 2000) describes the construct of expectancies for success. The theory has received notable empirical support over the last 30 years in relation to achievement and learning outcomes in different subject areas, as well as in relation to educational and career choices. Expectancies for success are defined as "individuals' beliefs about how well they will do on an upcoming task" (Eccles

& Wigfield, 2020, p. 3). Expectancies for success are coupled with subjective task values to better understand why students may not get involved in an activity although they have high expectations for success. That is, students who expect to do well in a task that has value for them (i.e., high interest, high attainment, high utility, low cost) are more likely to choose this task, to persist through challenges, and to perform well in the activity. Despite the debate about the minor definitional differences that may exist between expectancies for success and self-efficacy, there are strong conceptual similarities and empirical overlap (Eccles & Wigfield, 2020; Schunck & DiBenedetto, 2020).[2] In the context of the present chapter, these two constructs will be theorized as more similar than different.

Both self-efficacy and expectancies for success are personal in nature, but they do not develop on their own. As social-cognitive theories, both acknowledge the importance of children's prior achievement experiences (successes and failures) and the role of socializers (especially the role of parents and teachers). Particularly for parents, the focus is on how to support children in building positive self-efficacy or high expectations for success and could be discussed at least along two lines: (a) parents' contribution to children's personal accomplishments and (b) parents as sources of messages related to competence and achievement.

Building an academic history with positive achievement experiences and successes is the most important source of information for self-efficacy and for the development of a child's goals and self-schemata through which expectations for success are generated. Students tend to choose and work better on tasks with more previous successes than failures. Although teachers play a major role in building students' prior record of successes and failures, there is plenty of room for parents to significantly contribute to their child's academic accomplishments, especially in the elementary and middle school years. First, parents can support their children's skill development from very early in their life by providing learning opportunities at home or in relation to extracurricular activities. These learning opportunities need to be well structured with clear guidelines, consistent rules, and realistic performance standards in order to facilitate learning and develop competence. Parents can also support their children to achieve these standards and experience mastery in various activities either directly by helping them tolerate

2 A description of the debate on the conceptual similarities and differences between the two constructs (self-efficacy and expectancies for success) is outside the scope of this article. For more information about this, please read Anderman (2020), Schunck & DiBenedetto (2020), and Wigfield & Eccles (2000).

challenges and persist or indirectly by being proficient models themselves in the face of difficulties (e.g., Pomerantz & Grolnick, 2017; Usher & Schunk, 2018). Secondly, parents can support their children in their homework in qualitatively appropriate ways. However, this involvement, despite parents' good intentions in most cases, may not be beneficial for the child. Controlling involvement (e.g., providing commands, sitting next to the child, and immediately correcting mistakes) has negative consequences on subsequent motivation, affect, and achievement and undermines the child's active role in their own learning and self-regulation. In contrast, parents need to promote children's autonomy and self-regulation skills related to school tasks. This support can be academic (when parents have the requisite knowledge), pragmatic (provision of the necessary resources), and psychological (e.g., positive affect, emotion regulation). Autonomy-supportive involvement has a positive association with children's motivation and achievement, contributing to mastery experiences and competence development (e.g., Gonida & Cortina, 2014; Pomerantz & Grolnick, 2017).

Moreover, parents (along with teachers and peers) constitute powerful sources of feedback about competence and achievement along development. Parents hold beliefs about their children's competence and develop high or low expectancies for success that influence children's own expectancy beliefs (Gonida & Cortina, 2014; Muenks et al., 2018; Usher & Schunk, 2018). These paths endure as children progress in school grades; parents' beliefs about the child's competence predict the child's self-competence beliefs years later (e.g., Simpkins et al., 2012). The content of feedback (e.g., focusing on strengths and/or weaknesses) as well as the way it is communicated to children (e.g., encouraging or critical) affect children's own efficacy and expectancy-related beliefs. Thus, it is recommended that parents avoid harsh criticism that could threaten children's perceptions of their own competence. Instead, parents should provide informative feedback, making use of both strengths and areas that need improvement. Further, they need to communicate to their children messages to build confidence for further improvement through effort, systematic work, and strategy use. A significant prerequisite to the above recommendations is that parents are aware and have a realistic view of their children's strengths and weaknesses so that they can provide any needed support. This will also help children on their way to calibrated competence beliefs.

CONCLUDING REMARKS: PRACTICAL IMPLICATIONS

Recommendations for practice stemming from motivational theories and research, although clear, are not always easy to apply consistently in the family context. Several factors related not only to parents and students, but also to the school-family collaboration, constitute potential barriers that may undermine the adaptive role of parents in student achievement motivation. Specifically, parents have their own beliefs about school success and failure, learning and performance, as well as preferences for actions and behavioral patterns in relation to their involvement in schoolwork. Sometimes, parents may also transfer their own school experiences to their interaction with their children during schoolwork. These beliefs and behaviors are not necessarily positive or aligned with contemporary theory and evidence, and they are frequently crystallized and resistant to change toward more adaptive beliefs and behaviors.

Furthermore, the family context interacts with the school context as both constitute the main settings in which children live, learn and may thirve or not. operate. Specifically, children are engaged in achievement situations in both contexts, acquire knowledge and skills and develop competence, receive messages about learning and performance as well as informative feedback and/or praise, get typical or non-typical evaluation about their performance, attribute successes and failures to different factors, and discuss their performance and learning experiences with classmates. The necessity for consistency of messages conveyed to children by both parents and teachers in relation to learning, performance, competence, behaviors, and practices is a critical issue. Consistent messages related to adaptive motivational beliefs and practices in both contexts will facilitate their adoption by the students. This consistency between teachers' and parents' motivational beliefs and practices could be seen as the result of a meaningful teacher–parent alliance for empowerment (Albrecht, 2020) built on mutual trust (Lerkkanen & Pakarinen, 2019). This dimension of the school–family partnership is important to include in preservice and in-service teacher education (Epstein, 2018). Specifically, practices of family engagement and effective teacher–parent collaboration aiming to empower parents toward more adaptive motivational beliefs and practices for their children should be part of every teacher's repertoire of professional strategies. School psychologists should also see the promotion of this partnership as an important component of their

professional identity and prioritize it in the school context to further support children's learning, achievement, and connection to school (Christenson, 2003).

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STUDENT MOTIVATION IN A COOPERATIVE LEARNING CONTEXT*

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Abstract. The aim of this paper is to point out the role and potential of cooperative learning, as an instructional strategy in developing students' motivation to learn. First, in the context of numerous studies that confirm the importance of peer relationships for the overall development of children and youth, we analyse the mechanisms through which social competence and social relationships contribute to motivation and achieving academic goals. Different instructional strategies based on students' social relations and group support in the classroom are briefly presented, and key differences between group work, collaborative and cooperative learning are highlighted. Also, we analyse how the basic structural elements of cooperative approach, such as group goals, positive interdependence, individual responsibility, autonomy in work, learning social skills, discussion and group problem solving, contribute to student motivation. Finally, a review of research on the effects of cooperative learning on different motivational variables (for example, student engagement, situational interests, self-competence, goal orientation), in different school subjects and levels of schooling is made.

Keywords: student motivation, cooperative learning, peer relationships, social competence, school.

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INTRODUCTION

Contemporary approaches in motivation research point to the importance studying motivation in context. Investigating motivation in real-life learning environments in increasingly social and interactive situations is expected to provide more realistic information on the conditions and dynamic features that contribute to students' engagement in these contexts (Järvelä et al., 2008).

Considering that motivation is regarded to be one of the most important predictors of achievement but also one of the valuable educational outcomes, significant efforts are made to create an optimum learning context and to design teaching strategies that would promote student motivation. Searching for features of those strategies, numerous authors find that some of them are crucial, such as: the sense of autonomy and control students have in learning situations, challenging learning tasks, respecting student's interests, contextualized learning that enables application of knowledge and skills in real-life situations, and creating a supporting classroom climate so as to provide the active participation of all students. In light of these stated features, cooperative learning is considered as one of the most promising strategies, especially due to its long tradition and the solid empirical evidence of the success of its application in classroom.

The goal of this paper is to analyse the motivational potentials of a cooperative learning context. In order to realize the goal, we discuss some related issues. First, in accordance with the conceptualization of the construct of motivation as "fundamentally social in nature and origin" (Järvelä & Volet, 2004), we highlight the importance of peer interaction as a critical social context for shaping the development of children and youth and we analyse the basic mechanisms through which social competence and social relationships contribute to motivation and achieving academic goals. Second, we discuss how different theoretical perspectives explain the beneficial effects of essential structural elements (positive interdependence, individual accountability, appropriate use of social skills, promotive interaction and group processing) on student motivation. Third, in order to get a more comprehensive insight into the effects of cooperative learning on motivation we make a review of recent research in this field. Based on established criteria, we selected and analysed relevant studies that were published in the period from 2000 to 2022. Finally, we point out some implications for practice regarding the implementation of cooperative learning in the classroom.

SOCIAL NATURE OF MOTIVATION: THE ROLE OF PEER INTERACTIONS

Schools and classrooms are by definition social environments. Within classroom, students have social interactions and build social relationships with their teachers and with classmates. In accordance with the self-determination theory of motivation (Deci & Ryan, 1985), schools and classrooms are places where students strive to fulfil their needs for relatedness as well as for autonomy and competence.

There are many dimensions of interpersonal relationships that have the potential to influence academic motivation. A number of researchers interested in students' motivation, particularly those who focus on the dynamics of motivation within classroom settings, have begun to pay increasing attention to the potential role of interpersonal and relational variables in students' engagement. The idea that individuals pursue social motives or that social perceptions are associated with academic motivation is not new (Deci & Ryan, 1985; Juvonen & Wentzel, 1996; Wentzel, 1998). An extensive body of research suggests significant relations between positive motivational outcomes and supportive social relationships (Anderman & Kaplan, 2008; Furrer et al., 2014; Wentzel et al., 2012; Wentzel, 2017). The latest research in the social-psychological framework confirms that interpersonal relationships that provide students with a sense of belongingness can be powerful incentives of children's motivation, interest, and subsequent engagement in school activities (Allen et al., 2021; Allen et al., 2022; Baumeister & Robson, 2021; Korpershoek et al., 2020). A sense of social support from teacher and peers is believed to lead to the adoption of socially valued goals and objectives (Anderman & Anderman, 1999), and recent research evidence shows that social support influences students' learning motivation (Martinot et al., 2022; Song et al., 2015; Wang & Eccles, 2012). Wentzel and colleagues (2010) extended the work on social support in school by investigating the utility of multiple dimensions of support from teachers and peers in predicting student motivation. Results of the study indicate that students are likely to display positive aspects of social and academic motivation when: (a) they perceive their teachers and peers provide clear expectations for social and academic outcomes; (b) attempts to achieve these valued outcomes are met with help and instruction; (c) attempts to achieve outcomes can be made in a safe, non-threatening environment; (d) individuals are made to feel like valued members of the group. From a theoretical perspective, these dimensions have been identified as essential characteristics of

contexts that promote positive developmental outcomes in school-aged children (Bronfenbrenner, 1989). Identifying different types of activities that comprise the broader notion of support is important for determining which specific provisions are most effective in promoting student engagement.

It is widely acknowledged that experiences with peers constitute an important developmental context for children and adolescents. In general, researchers have focused more on teachers and parents than peers as socializing agents of motivation and engagement. Wentzel (1998) found that perceived support from peers is the only independent, positive predictor of prosocial goal pursuit, meaning that peer support motivates children to cooperate, to be socially responsible, and to follow classroom rules. This finding is consistent with the notion that adolescents' perceptions of their relationships with peers play a fairly unique role in motivating them to help and cooperate with each other. Ryan (2000) found that the peer group was influential regarding changes in students' intrinsic value for school (i.e., liking and enjoying) as well as achievement during their first year in middle school. Students have the potential to create a climate of emotional support and adolescents report that their peer groups provide them with a sense of emotional security. Those who do not perceive their relationships with peers as providing care and support, tend to be at risk of experiencing academic and behavioural problems (Goodenow, 1993; Wentzel, 1994).

Interactions with peers that contribute to structure in the classroom are important for the development of a sense of control. Although they do not provide structure in the same way that teachers do, classroom peers provide contextual affordances that can support academic competence (Wentzel, 2009). For example, when interacting with classmates, students practice communicating, give and receive feedback, model academic competencies, resolve conflicts, provide help and advice, create shared academic goals and behavioural standards. Interactions with classroom peers can also fulfil students' need for autonomy. Similar to structure, peers are not autonomously supportive in the way teachers can be, but research suggests that peers can promote each other's autonomy when they try to understand each other's points of view (Furrer et al., 2014). When students work together to negotiate activities in the classroom, cooperate on group projects, examine and challenge their own beliefs, explain the relevance of classroom assignments to each other, engage in self-exploration, and share their ideas, they create an autonomy-supportive context.

Early adolescence is a particularly important developmental period for examining the role of peers in academic motivation (Brown & Larson, 2009; Reindl, 2021). Peer relationships during this period are viewed widely as more intense, closer, and more influential than those formed during childhood. Generally, this influence may peak during early adolescence, as youth spend more time with peers, place increased importance on peer approval and advice, and look to peers as a source of identity (Hartup, 1996; Wentzel, 2017). Early adolescent cognitive development produces greater sensitivity to peer feedback and greater skill at using social comparisons to assess one's own competence level (Dweck, 2002). The transition to middle school brings more competition for grades and ability-grouped classrooms. These changes may prompt adolescents to re-evaluate their academic beliefs and behaviour and may increase the salience of peers in these processes. For these reasons, one might expect to find stronger evidence of peer influence on achievement motivation after the transition to middle school. For example, Molloy et al. (2011) use longitudinal data to examine the relative role of three distinct types of peer relationships (reciprocated friendships, frequent interactions, and shared group membership) in within-year changes in academic self-concept and engagement before and after the transition to middle school (fifth and seventh grade). Results suggest that the unique roles of each type of peer relationship differentially influencing changes in youths' academic adjustment, as well as stronger effects during seventh rather than fifth grade for both academic self-concept and effort. The authors conclude that different patterns of influence across grade levels bolster evidence that academic motivation may be especially susceptible to influence after the transition to middle school.

In light of evidence that links children's adaptive functioning across social and academic domains, an important issue that is addressed is, why do these relations exist? Ryan (2000) discusses three basic mechanisms of motivation and achievement in peer socialization: information exchange, modelling, and reinforcement of peer norms and values. Findings from experimental studies suggest that the influence of peers depends on information exchange, because discussions with peers may present an adolescent with new ideas and different perspectives. Modelling refers to individual changes in cognition, behaviour, or affect that result from the observation of others. Depending on the consequences, observation of a model can strengthen or weaken the likelihood that the observer will engage in such behaviour or adopt such beliefs in the future (Bandura, 1986).

Experimental studies prove that peers are potentially powerful models for the socialization of motivation, engagement, and achievement. For example, children's preference for challenge on a different task is influenced by exposure to a peer model's preference for a challenge (Sagotsky & Lepper, 1982). Studies that documented that peer groups become more similar over time have assumed that peer pressure and social reinforcement also play a role in how the peers influence adolescent motivation (Brown et al., 1986). In other words, beliefs and behaviours that are encouraged or positively received by the peer group are more likely to manifest again in the presence of one's peers.

The increasing number of studies relating to academic and social processes expands understanding of the complex and multifaceted ways by which interpersonal relations and academic motivation affect each other. The research evidence indicates two important features of the effect of peers on academic motivation. First, the effects are complex and vary across students, depending in part on culture and the values of students and their peers (Urdan & Schoenfelder, 2006). Second, the relationship between social and academic goals can be influenced by teacher policies and practices in the classroom. Teachers can reduce the potential conflict between social and academic goals by not forcing students to choose between the two. In other words, allowing students to fulfil both relatedness and competence needs in the classroom can enhance motivation and achievement. One way that teachers can do this is by effectively using cooperative learning structures in the classroom.

Cooperative Learning Contexts: Essential Structural Elements as Motivational Components

A basic mechanism underlying cooperative learning is using the benefits of peer interactions for the purpose of achieving academic and social outcomes. Researchers have defined cooperative learning contexts as situations in which students work together in small groups to achieve individual and group goals, in order to maximize their own and each other's learning (Johnson & Johnson, 2009; Johnson et al., 2013). Interpreting cooperative learning from a motivational perspective, Slavin (1984) attributed success of cooperative learning to cooperative incentive structures. According to this premise, these structures create situations

in which students need to encourage one another to do their best in an effort to successfully achieve group goals.

Cooperative learning entails small groups working on specific tasks. It seeks to overcome some of the weaknesses of traditional small group approaches by structuring activities carefully. Growing literature on small-group learning distinguishes between cooperative and collaborative learning. Cooperative learning may be described as a structured, systematic instructional strategy in which small groups work together toward a common goal. In contrast, collaborative learning is characterized by relatively unstructured processes through which participants negotiate goals, define problems, develop procedures, and produce socially constructed knowledge in small groups (Matthews et al., 1995).

Not all group efforts are cooperative. Simply placing individuals in groups and telling them to work together does not in and of itself result in cooperative efforts. Seating students together can result in competition or individualistic efforts with talking (traditional learning groups). Effective cooperative groups are rarely encountered in class because teachers and students are not well prepared and accordingly try to find a shortcut to quality group work. Cooperation will only develop under a certain set of conditions. In order to build and maintain cooperative effects, five essential elements must be carefully structured into the learning situation: (1) positive interdependence, (2) individual accountability, (3) promotive interaction, (4) the appropriate use of social skills, and (5) group processing (Johnson & Johnson, 2009; 2014).

Creating positive interdependence in the group is the prerequisite for students to cooperate during learning (Deutsch, 1949). Positive interdependence is the perception that one is linked with others in a way so that one cannot succeed unless they all do (and *vice versa*). When individuals' successes contribute to the group's success, positive interdependence is established. Structuring this element ensures that group members become aware that they have two types of responsibilities: to learn the specific material and to help all group members learn their part of the task. Such positive peer pressure affects especially low-ability students and unmotivated ones to put in more effort (Ševkušić, 1993). Structuring positive interdependence can be achieved through: learning goals, rewards, complementary roles, and teaching materials.

Telling students that they need to achieve a group goal is the most important moment in ensuring cooperative learning. It is a way to provide support to group

members so that they are willing to exert maximum effort in accordance with the group goal. As Slavin (1996) discussed, a cooperative learning context has unique characteristics that lead students to work not only independently, but also cooperatively as a collective group agent for the sake of accomplishing group goals or shared tasks.

Rewards are an integral scaffold of well-defined cooperative methods. Group rewards given based on individual performances are known to increase individuals' learning and are thought to do so by motivating them to share knowledge. In the absence of external scaffolds, such as group rewards, cooperative learning shows little educational benefit (Sears & Pai, 2012). One of the most extensively studied and successful scaffolds of cooperative learning promotes positive interdependence by providing group rewards based upon individual test scores. As an example, if the combined average of each group member's test score is higher than their previous average, then the group members may each receive a certificate of achievement (Slavin, 1995). The idea is that with the right balance of motivation toward the task and the group, students will balance their degree of social interaction and task interaction to learn the material themselves while helping their peers learn it too. Based on this assumptions, Slavin (1978) devised a cooperative strategy technique – STAD (Student Team Achievement Division).

Structuring positive interdependence can also be achieved by assigning complementary roles to group members, without which it would not be possible to complete the group task. For example, in the group there may be a researcher who is assigned to provide the appropriate sources of information, a controller who periodically checks t whether he other members have understood the task well, etc. (Ševkušić, 2003). The way in which teachers structure learning material and sources of information can contribute to positive interdependence. For example, the learning content can be structured in a way that it represents a kind of puzzle, of which each member of the group gets a piece. A cooperative technique *Jigsaw* is based on this strategy (Aronson et al., 1978). Some research has examined which strategies for structuring positive interdependence are most effective in terms of group productivity. The results show that a combination of interdependent goals and rewards, as well as a combination of interdependent goals and teaching materials, produces the best results (Mesch et al., 1988).

Individual accountability as an essential element of cooperative learning context exists when the performance of each individual student is assessed and

the results given back to the group and the individual (Johnson & Johnson, 1989). Each group member has a personal responsibility for completing his/her share of the work and facilitating the work of other group members. Group members also need to know who needs more assistance, support, and encouragement in completing the assignment.

The third essential element is promotive interaction (Johnson & Johnson, 1989). Students promote each other's success by helping, assisting, supporting, encouraging, and praising each other's efforts to learn. Doing so results in cognitive processes, such as explaining how to solve problems, discussing the nature of the concepts being learned, teaching one's knowledge to classmates, challenging each other's reasoning, and connecting present with past learning. It also results in interpersonal processes, such as modelling, appropriate use of social skills, supporting, and encouraging efforts to learn.

Theories of group dynamics are based on the assumption that social skills are the key to group productivity, so the essential element of cooperative structure is also the appropriate use of social skills. A cooperative effort requires interpersonal and small group skills such as: leadership, decision-making, trustbuilding, communication, conflict-management skills, etc. Social skills have to be taught just as purposefully as academic skills. In addition to improving achievement, these skills contribute to building more positive relationships among group members. The fifth essential element is group processing, which occurs when group members (a) reflect on members' actions as helpful or unhelpful and (b) make decisions about which actions to continue or change. The purpose of group processing is to clarify and improve the effectiveness with which members carry out the processes necessary to achieve the group's goals (Johnson & Johnson, 2009).

Considering the essential elements of cooperative structure, the question arises: how can the beneficial effects of cooperative learning on student motivation be explained?

Motivational perspectives on cooperative learning focus primarily on the reward or goal structures under which students operate (Slavin, 1996). Learning motivation theorists assert that the traditional learning environment, where students tend to compete against each other for reinforcement, creates peer norms that oppose academic efforts. This is because one student's success reduces others' chances for success, and thus academic effort is typically not encouraged by peers. In contrast, in the cooperative learning context, students

provide reinforcement for one another because of their positive interdependence. Rewarding groups based on group performance (or the sum of individual performances) creates an interpersonal reward structure in which group members will give or withhold social reinforces (e.g., praise, encouragement) in response to groupmates' task-related efforts. The theoretical rationale for the group reward is that if students value the success of the group, they will encourage and help one another to achieve it. Use of group goals or group rewards enhances the achievement outcomes of cooperative learning if and only if the group rewards are based on the individual learning of all group members (Slavin, 1995). So, from the motivational perspective, students help their groupmates learn at least in part because it is in their own interests to do so. Experts in cooperative learning hold that having external reasons to work together in cooperative groups can lead to the development of intrinsic motivation to learn in the long term.

A somewhat different point of view is represented by the theory of group cohesiveness, which emphasizes the idea that students help their groupmates learn because they care about the group. Slavin concludes that the *Jigsaw* technique is based on the premises of the theory of group cohesiveness because it uses "task specialization" method, which should support the students' need to experience social relatedness (Slavin, 1996, p. 47).

In relation to a group goals (or shared goals) structure, Ames (1992) states that cooperative learning creates a more mastery-oriented context, leading students to adopt mastery goal orientations (or learning goal). Research has indicated that students who adopt learning goals accept challenging tasks and expend effort in the face of task difficulty, while students with performance goals (i.e., those trying to look good to others or avoid looking bad) tend to avoid challenges and are less persistent when difficulties are encountered (Elliot & Dweck, 1988). Mastery goal orientations have been mainly associated with adaptive patterns of behavior, such as student intrinsic motivation and engagement (Dweck & Leggett, 1988). Nichols and Miller (1994) also reported that high school students in cooperative learning showed higher levels of mastery goal orientation, intrinsic value, and achievement than students in a traditional lecture group.

The results of a large amount of research on the effects of self-determination and self-regulation on student motivation, as well as on the effects of student's sense of control over the learning situation, indicate their positive influence on intrinsic motivation. Learning in a cooperative context establishes, to a certain

extent, students' control over the learning process and consequently increases their motivation (Johnson et al., 1978). In cooperative learning, students have opportunities to meet challenges, to choose activities and to be actively involved in developing curricula and class procedures and gives the group members sense of "ownership" of their learning, instead of passively accepting information from an outside expert. According to SDT theory, empowering students in terms of supporting their autonomy in learning is considered to be a critical component in increasing an individual's intrinsic motivation (Deci & Ryan, 1987).

Also, intrinsic motivation tends to result from meaningful feedback relevant to the extent to which students competently complete their current tasks (Ning & Hornby, 2014; Johnson & Johnson, 2009). In the cooperative context, meaningful feedback is provided by group peers and the teacher immediately after selected teams have presented their work. Through feedback, students should gain a clear picture of their strengths and weaknesses and understand how they can improve their work, which could lead to the feeling that their work and effort were valued and recognized by the teacher and their peers.

One of the main assumptions is that cooperative learning methods have the potential to accomplish the basic needs in the theory of self-determination: autonomy, competence and relatedness, and thus to enhance the probability of intrinsically motivated, deep-level learning (Ryan & Deci, 2000). Hänze and Berger (2007) found that students in cooperative learning groups reported significantly higher autonomy, competence, and relatedness than peers in traditional classrooms. The experience of competence seemed to be central as a psychological mechanism, explaining the benefits of cooperative learning. Relatedness, the need to feel a sense of belonging or connectedness with others, is particularly relevant to cooperative learning. Cooperative structure emphasizes the importance of creating a supportive, caring and positively interdependent environment, where students feel safe to speak and are highly motivated to contribute to group goals. Special attention is paid to the quality of communication that takes place between students during cooperation. Proponents of cooperative learning consider such a context crucial for engaging students in discussion and exchange of ideas and viewpoints which is a favourable environment for practicing skills at higher cognitive levels. Four strategies of thinking are most often used by students during work in cooperative groups: problem solving, decision making, critical thinking, and creative thinking (Ševkušić, 2006).

As teachers observe and facilitate the group processes, more opportunities are created for students to interact personally with the teacher. Numerous studies confirm that students are motivated to engage in classroom activities if they believe teachers care about them. Wentzel (1998) found that students described caring teachers as demonstrating democratic, supporting interaction style and as those who model caring behaviour in students. Cooperative learning structures foster these characteristics in teachers.

Effects of Cooperative Learning Methods on Student Motivation: A Review of Recent Research

Based on the amount and quality of research evidence collected especially since the 1970s, Slavin (1996, p. 43) stated that "research on cooperative learning is one of the greatest success stories in the history of educational research". Hundreds of studies have compared cooperative learning to competitive and individual efforts and confirmed its superiority for the broad range of measures. The diverse outcomes of cooperative methods may be subsumed within three broad categories: effort to achieve, positive interpersonal relationships, and psychological adjustment (Johnson & Johnson, 2014). Numerous meta-analyses up to year 2000 indicated that by far the most frequent research goal was to determine the effects of cooperative learning on student achievement (e.g. Johnson et al., 1981; Johnson et al., 2000; Slavin, 1996). However, considerable attention was also focused on the potentials of cooperative methods for the development of student motivation (e.g. Slavin, 1984; Nichols & Miller, 1994; Nichols, 1996).

In order to get a more comprehensive insight into the effects of cooperative learning on student motivation, we have carried out a review of recent research in this field. The purpose of the review is to analyse the selected studies published in the last two decades with regard to the following characteristics: educational levels and teaching subjects in which cooperative intervention was implemented, type of cooperative strategies that were applied, the dimensions of motivation that were examined, and the effects that have been achieved.

Study selection. The method included systematic computer searches for relevant primary studies and meta-analyses via Google Scholar and in Educational Resources Information Centre (ERIC), Scopus and the Social Sciences Citation Index (SSCI) databases: We used the following key words or phrases and their

combinations for searching: cooperative learning, cooperative context, cooperative structures, cooperative methods, student motivation, intrinsic motivation, student engagement, student in-class participation. Studies were selected if they met the following eligibility criteria: (a) a study was published in the period from 2000 to 2022; (b) a study is an article published in a peer reviewed scientific journal; (c) a study comparing effects of cooperative learning with traditional teaching methods or study using "one group pre-test/post-test" research design.

In line with these criteria, 13 primary studies and one meta-analysis were identified; considering that meta-analysis encompasses 5 studies, the research corpus on which the analysis is conducted consists of 18 research papers. The selected studies on the effects of cooperative learning on student motivation, classified according to the units of analysis, are presented in Table 1.

Tabela 1. Studies examining the effects of cooperative learning on student motivation (2000–2022)

Study	Edu. level	Subject	Strategy	Duration	Effects
Artut & Tarim (2007)	Higher	Math	Jigsaw	9-week	+
Artut (2009)	Preschool	Math	Jigsaw	10-week	+
Fernández-Espínola et al. (2020) (meta-analysis)	Elem & Sec & Higher	Physical Ed.	mixed	3-week to 6 months	+/-
Hanze & Berger (2007)	Secondary	Science	Jigsaw	semester	+
Herrmann (2013)	Higher	Political Sci.	mixed	10-week	+/0
Hortigüela-Alcalá et al. (2019)	Elem & Sec	Physical Ed.	TSP & Jigsaw	14-week	+
John et al, (2014)	Secondary	Science	mixed	?	+
Ning & Hornby (2014)	Higher	English	STAD	18-week	+/0
Peterson & Miller (2004)	Higher	Psychology	Jigsaw	semester	+
Saleh et al. (2005)	Elementary	Science	STAD	9-week	+/0
Tarhan et al. (2013)	Elementary	Science	Jigsaw	semester	+
Tran (2019)	Higher	Methodology	GI	9-week	+
Tombak &Altun (2016)	Higher	Elective course	UbD	4-week	+
Wyk (2012)	Higher	Economics	STAD	12-week	+

Note. + indicates positive effect on all motivational variables; +/0 indicates mixed effects on different motivational variables (0 indicates no effect); - indicates negative effect.

Regarding the research design, the largest number of studies (16) applied an experimental or quasi-experimental design (with control groups) comparing effects

of cooperative learning with whole-class instruction. Only two studies used pre-test/post-test one group design (Herrmann, 2013; Saleh et al., 2005).

Education levels. The studies have been conducted at all levels of schooling. The largest number were done with participants attending university (age 18 and over), an almost equal number of research papers included students from elementary (six studies) and secondary school (five studies) and one study dealt with preschool children. Prior comprehensive meta-analyses had demonstrated that the vast majority of studies about cooperative learning were conducted with students in elementary and secondary schools (e. g. Johnson et al., 2000; Slavin, 1996). Our review indicates that in recent years the scholarly interest in cooperative learning has increased in higher education research.

Teaching subjects. The results of analysis show that the trend of cooperative learning research across different curriculum domains continues. Our review is dominated by studies that examine cooperative intervention in physical education (six studies). Namely, in addition to study comparing the effects of cooperative learning in physical education at two educational levels (Hortigüela-Alcalá et al., 2019), five more studies in physical education were included in the meta-analysis (Fernández-Espínola et al., 2020).

Cooperative strategies and duration of the interventions. Cooperative learning is a generic term that refers to numerous methods for organizing classroom instruction. In most studies in this review, the authors applied well-known and well-defined cooperative learning strategies which have strong empirical support, such as Jigsaw (Aronson et al., 1978), STAD (Slavin, 1978) and Group Investigation – GI (Sharan & Sharan, 1990). Examining the effectiveness of various cooperative methods in terms of maximizing student achievement, Johnson and Johnson (2000) stated that these three methods to be among the most effective. In studies that are marked as "mixed" in terms of the applied strategy (see Table 1), the authors used hybrid cooperative techniques (Fernández-Espínola et al., 2018) or combined cooperative structure with some other learning methods, for example with Mastery Learning Approach (John et al., 2014). Duration of the intervention (application of cooperative learning) ranges from 3 weeks to 6 months. In one study, the authors did not specify how long the intervention lasted.

Motivational variables. Different dimensions and components of student motivation were examined in selected studies: intrinsic motivation, extrinsic motivation, task-value, academic goal orientation, self-efficacy, self-regulation,

external regulation, motivational beliefs toward cooperative learning, degree of student engagement, student in-class participation, interest in the topic, etc. For the most part, motivational variables were measured using scales and questionnaires (16 studies). For example, the motivational scale developed by Pintrich and colleagues (1991) was applied in two studies (Tombak & Altun, 2016; Tran, 2019). This scale includes six sub-scales: self-regulation, intrinsic value, task value, learning belief, self-efficacy and exam anxiety. In two studies, authors applied qualitative methods to exemine student motivation: observation of childrens' activities (Artut, 2009) and student interviews (Tarhan et al., 2013).

Effects on student motivation. Analysis of the results of selected studies generally shows that cooperative learning is superior compared to traditional teaching methods in terms of effects on student motivation. In the vast majority of studies, cooperative learning significantly contributed to the increase in value of all investigated motivational variables. For example, Peterson and Miller (2004) found that overall quality of college students' experience was greater during cooperative learning: benefits occurred specifically for intrinsic motivation, thinking on task, student engagement, perceptions of task importance, and optimal levels of challenge and skill. Also, comparing the effects of cooperative learning and whole-class instruction in physics classes, Hanze & Berger (2007) reported that secondary school students felt stronger intrinsic motivation; they developed greater interest in the topic; they felt more competent, more autonomous and more related to classmate, and they reported more cognitive activation. From the five interventions based on cooperative learning included in the meta-analysis (Fernández-Espínola et al., 2020), four studies reported a significant improvement in students' intrinsic motivation in physical education. However, one study found a decrease in intrinsic motivation (Fernández-Arguelles & González-González de Mesa, 2018). This study had a sample composed of primary school students with a mean age of 8.4, and the authors concluded that an important limitation of their study was the young age of students, which could have impaired the realisation of the program, given the complexity of the cooperative intervention carried out in the sessions.

Some studies report positive effects of cooperative learning on certain dimensions of motivation, but not on others. For example, Ning and Hornby (2014) compared the impact of the cooperative learning approach with that of traditional whole-class instruction on six aspects of learning motivation: intrinsic motivation,

integrated regulation, identified regulation, introjected regulation, and external regulation. Findings suggested significant differences in favour of cooperative learning in improving intrinsic motivation, but no differences were found on any of the four subtypes of extrinsic motivation. Herrmann (2013) stated that cooperative learning structures raised the level of engagement of university students but do not promoted their deep approach to learning.

An important question that the authors of the selected studies also asked was: Whether the effectiveness of cooperative learning on student motivation depends on students' personal characteristics? Hänze & Berger (2007) revealed that critical group of students with a low academic self-concept felt more competent and more motivated in cooperative groups than in the traditional teaching setting because they experienced a feeling of greater competence. Also, the results of the study by Saleh and colleagues (2004) indicated that low-ability students were more motivated to learn in heterogeneous than in homogeneous groups, whereas the experience of high-ability students does not differ as a function of group composition. These results are consistent with the findings of previous studies, not included in this research review (e.g., Azmitia, 1988; Hooper & Hannafin, 1991). It turns out that the low-ability students benefit most from the social interaction involved in cooperative learning because they can ask their group mates for help and explanations.

In general, based on the analysis of the results of selected studies, some important conclusions could be drawn. *First*, the most consistent effects of cooperative learning across studies were obtained for intrinsic motivation. This finding is similar to the results of Csikszentmihalyi and Schneider (2000), who found that group work resulted in higher levels of *flow* (deeply involved in an activity) than did lectures. Cooperative learning provides a context that made *flow* possible because students rate the challenge of the cooperative activities significantly higher and feel more competent. The greater opportunity to experience *flow* during cooperative learning is important because *flow* has been associated with higher levels of concentration, enjoyment, motivation, self-esteem, perceived task importance and consequently to greater student achievement. *Second*, these studies demonstrate that cooperative methods are almost equally effective for motivating students at different educational levels. In particular, increasing motivation among secondary education students is noteworthy because numerous studies indicate that school motivation tends to decrease at this level (Anderman

& Maehr, 1994; Pintrich & Schunk, 2002). *Third*, the diversity of the applied cooperative learning methods provides additional validation of the effectiveness of cooperative learning for student motivation. These methods range from direct, specific procedures (such as Jigsaw) to more conceptual frameworks (such as Group Investigation), and the results indicate that regardless of those differences, all strategies contributed to greater student motivation compared to whole class teaching.

CONCLUSION AND IMPLICATIONS

Our analysis of recent research on the effects of cooperative learning on student motivation supports the previous extensive empirical evidence consistent with theoretical and conceptual consideration about this teaching strategy. However, despite its numerous and various benefits, it should be understood that important conditions are necessary in order to achieve the above-mentioned effects. Among the most important are those concerning teachers: their knowledge, skills and attitudes towards cooperative learning, Teachers should carefully design cooperative learning tasks that help students achieve future goals and engage more actively in their learning experience. All motivational theories emphasize the importance of providing students with appropriately challenging academic tasks. To be intrinsically motivated, students need to perceive the task as challenging and interesting but not too complex. At the same time, research suggests that teachers have difficulty creating challenging tasks for all their students and with providing constructive, informative feedback (Urdan & Schoenfelder, 2006). Teachers also need to monitor their students' learning process and intervene when necessary to provide assistance or to model students' social skills. There is considerable question about whether teachers are well equipped to create cooperative, mastery oriented, and autonomy-supportive environments. This and similar questions related to the role of teachers in designing cooperative learning context have important implications for teacher education and professional development.

It should be noted that although it is evident that cooperation contributes to better results in various areas of students' development, compared to competition or individual work, using these teaching methods provide students with important

lessons for life. In addition to learning cooperative skills, students need to learn how to work independently and compete for fun. The main problem with these methods is that they dominate in teaching. Cooperation should provide an overall context for learning in which competition and individual work can be applied under certain conditions. It is up to the teacher to decide which goal structure is the most appropriate for the lesson.

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BOREDOM IN THE CLASSROOM AND STUDENT MOTIVATION

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Abstract. Boredom is often considered to be one of the major enemies of learning and is widespread in classroom settings, as it is one of the most commonly experienced emotions in students. Boredom has an important negative influence on student motivation and has negative consequences on learning outcomes, at all learning levels. In addition, boredom has consequences on the well-being of students. This research seeks answer many questions about boredom in classroom settings, such as what the causes of boredom are; how we can describe students who are more prone to experience boredom; why students find school boring very often; how we can combat boredom; what teachers can do to reduce boredom in schools; and what can be done to alleviate its negative consequences on motivation for learning and learning outcomes. In the chapter Boredom in the Classroom, we provide an overview of studies investigating proneness to boredom, paying special attention to boredom in the school context and its consequences on learning outcomes. We present an overview of studies investigating the antecedents of proneness to boredom. Different experiences of boredom (attentional boredom, meaningless boredom, mixed boredom) are covered. The paper explores the role of all relevant participants in the education context, i.e., students, teachers, and school mental health practicioners, in overcoming boredom. We discuss the implications of empirical findings on education research trying to identify opportunities for targeted intervention to reduce boredom in classroom settings.

Keywords: boredom, learning outcomes, motivation in education.

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INTRODUCTION

"I'm bored!" or "The school is boring!" are very frequent phrases we hear. We also frequently encounter news reporting on accidents and incidents that were caused by boredom, such as a teenager pointing a gun at cars passing by from the bridge on the highway (Ferguson & McLean, 2019), or a teenager who flipped his father's car onto its roof (Barlow, 2019), or workers who accidentally set fire to a shop by trying to cremate a mouse (Stubley, 2019). Literature reports that boredom is more common than we might think and widespread across the globe. Studies indicate that secondary school students are among the ones who commonly report being bored (Furlong et al., 2021). The survey conducted with North American youth, found that 91% of participants in the survey reported that they experienced boredom (see Eastwood et al., 2012). Studies show that among high-school students, boredom is experienced at school around one-third of the time (Goetz et al., 2013). Harris (2000) found that among students, about 90% experience boredom sometimes with a median of one time per day. A study by Mann and Robinson (2009) reported that 58% of university students in England reported that more than half of the lectures were boring. A study conducted in Germany found that more than 44% of middle school students were at least partly bored in classes (Daschmann et al., 2011). In the USA, more than a third of middle school students stated that their homework time and time spent in classes was boring (Larson & Richards, 1991).

Lay persons often think that boredom is something trivial and that it can be easily alleviated just by changing circumstances. This is probably the main reason why boredom and proneness to boredom are not sufficiently explored and understood. Additionally, the negative impact of boredom and how, in general, people deal with it (especially in a school setting) still lack adequate attention from researchers and practitioners. In psychological research, boredom is an important topic, as studies show that the majority of people experience boredom (Chin et al., 2017). Even more, academic boredom is considered the "plague" of modern society (Daschmann et al., 2014). What is also relevant is that boredom rarely emerges alone, that is, when someone experiences boredom it is frequently followed by other negative emotions like anger, sadness, loneliness, and worry.

Why do children and young people often complain about being bored and what are the consequences of experiencing such emotions on educational and

other outcomes? Are some people more prone to feeling boredom or can causes of boredom be attributed to contextual factors? Boredom is not only interesting for psychologists. It has been a topic of interest for philosophers since Ancient and Medieval Times. In Western philosophy, Schopenhauer and Kierkegaard studied boredom. Boredom was one of the central points in Arthur Schopenhauer's philosophy. He thought of it as one of two main driving forces in human nature, and in line with his pessimistic viewpoint, he considered boredom as proof that existence is worthless. Another highly influential western philosopher, Søren Kierkegaard, thought of boredom as "the root of all evil", and at the same time he considered it as one of the major driving forces, that is, the impetus for action (Kierkegaard, 1843/1897). Therefore, boredom presents a very relevant and interesting topic, and studying boredom in the classroom deserves to have an important place in educational psychology.

Emotions in the Academic Setting – Achievement Emotions

In educational research, studying emotions has great importance as they are crucial for cognitive development and optimal learning (Linnenbrink-Garcia & Pekrun, 2011). However, studies show that so-called basic emotions are rarely experienced during learning and in school (Vogel-Walcutt et al., 2012). Recent literature shows that, in an educational setting, students can experience a wide range of emotions, both positive and negative. Academic emotions are those specifically and directly related to learning outcomes. Researchers identified nine academic emotions: joy, hope, pride, well-being, anxiety, anger, helplessness, frustration, and boredom (Özerk, 2020; Pekrun et al., 2002; Pekrun et al., 2007). Pekrun and collaborators (2007) divide these academic emotions into four categories: positive activating, positive deactivating, negative activating, and negative deactivating. Boredom can be classified into negative deactivating emotions because it is unpleasant and involves decreased physiological activation (Pekrun et al., 2010).

Scholars agree that, except for anxiety, achievement emotions are not studied sufficiently, and this applies to boredom too (Özerk, 2020). One of the reasons why boredom in school stays out of the focus of all participants in academic life is that it can be described as a quiet emotion. That is, it does not contain necessarily disruptive components, like anger, or is not considered psychopathological, like anxiety. However, on the contrary, boredom should not be treated as less harmful.

Outcomes and Consequences of Boredom

Research shows that boredom can generate a variety of consequences (see Pfattheicher et al., 2021). Sometimes boredom can result in positive consequences, like daydreaming and creativity (Mann & Cadman, 2014) and prosocial intentions (Van Tilburg & Igou, 2016). Sometimes boredom results in more neutral outcomes, like snacking (Moynihan et al., 2015). However, literature reports a substantial amount of evidence showing that boredom can result in various adverse mental health and academic outcomes. For example, it has been shown that boredom is positively related to substance abuse (LePera, 2011; Weybright et al., 2015), self-inflicted pain (Havermans et al., 2015; Nederkoorn et al., 2016), sadistic aggression (Pfattheicher et al., 2021), or even self-inducing electric shocks (see Buttrick et al., 2019; Wilson et al., 2014).

Besides viewing it as a transitory state, boredom can be pervasive and chronic. Life outcomes related to boredom might deplete experiencing positive feelings like joy, happiness, and the meaning of life. Although the mechanism is not completely understood, studies showed that chronic boredom and boredom proneness are associated with higher mortality which gives credibility to the famous saying "bored to death" (Bloomfield & Kennedy, 2006; Britton & Shipley, 2010). Boredom is related to increased loneliness (e.g., Skues et al., 2016), decreased well-being (Game, 2007), and decreased physical activity and self-rated health (Britton & Shipley, 2010). Boredom has been found to correlate with depression and anxiety (Goldberg et al., 2011; van Hooft & van Hooft, 2018), alexithymia (Eastwood et al., 2007), somatization complaints (Sommers & Vodanovich, 2000), etc. Students who cope with boredom successfully are found to be happier, self-confident, and more satisfied (Nett et al., 2010).

Boredom in the Classroom

There are several signs indicating that the student experiences boredom (Pekrun et al., 2010). These students usually show a lack of stimulation and low physiological activation, use a slow monotonous voice, demonstrate facial and postural expressions of boredom, have altered perception of time, and tend to escape situations perceived as boring (Nett et al., 2010). In addition, they also

subjectively perceive time as prolonged, and experience states of unpleasant feelings.

Studies show that boredom is commonly experienced among students, but unfortunately, boredom is to some extent neglected among academics and practitioners, as more attention is still dedicated to other emotions, like anxiety. Boredom is experienced as an aversive state and it usually happens when the current task is evaluated as of little value; it motivates people to take action to feel better (Pfattheicher et al., 2022).

Boredom negatively affects scholastic achievement. Pekrun and colleagues (2010) showed that students who feel bored tend to experience more attention problems and lower intrinsic motivation, effort, use of elaboration strategies, self-regulation, and subsequent academic performance. Boredom also presents a significant problem in education. Bored students do not express their cognitive and metacognitive potential, leading to lower academic achievement. Boredom is associated with higher school dropout rates (Maroldo, 1986), can present a motivational barrier and has detrimental effects on academic learning (Pekrun et al., 2002), and can even lead to engagement in sadistic actions in school (Pfattheicher et al., 2022).

THE THEORETICAL FRAMEWORK OF BOREDOM

An overview of contemporary literature on boredom shows that many definitions exist. However, authors agree that boredom presents an experience that is accompanied by a reduction of attention, physical inaction, and a sense of time distortion. It is also associated with a negative attitude towards an activity and an inability to specify what one desires. A bored individual has a passive attitude, hoping for a change from an external source (see Tze et al., 2016).

Boredom can be viewed both as a trait and as a state. As a trait, boredom is defined as an individual's propensity to experience feelings of disinterest (van Hooft & van Hooft, 2018). In other words, trait boredom is a characteristic that a person possesses, it presents individual differences in how easily a person perceives a situation as boring, and it is a relatively stable characteristic (Chan et al., 2018; Ng et al., 2015).

On the other hand, state boredom is situation based. That is, the majority of scholars would define state boredom as an unpleasant emotional state that usually arises when a situation is perceived and interpreted as monotonous or dull. Empirical findings suggest that trait and state boredom are similar but distinct constructs and that they correlate moderately. Also, studies show that people more prone to trait boredom are more likely to experience state boredom (Mercer-Lynn et al., 2014). Here, we will focus on state boredom, since it is possible to lower it and to alleviate its consequences through adequate actions that will be described later.

Contemporary research on boredom offers a theoretical framework labeled Meaning and Attentional Components (MAC) (Westgate, 2020), which mostly encompasses attentional and functional approaches to boredom. The MAC model proposes that boredom is an affective indicator of unsuccessful attentional engagement in situations and activities in which we are involved. That is, the model proposes that attention and meaning are orthogonal predictors of boredom and that different profiles of boredom can appear as a function of meaning and attention. When a person is in a situation that does not have sufficient meaning or does not pay attention, boredom arises.

According to the MAC model, attention and meaning are independent causes of boredom, which results in different profiles of boredom (Westgate & Wilson, 2018). The most common is boredom which results from both attention and meaning deficits, and it is considered prototypical boredom and most frequently experienced in school (Barrett, 2006). Boredom can also result from deficits in meaning when activities do not match up with current goals, and such boredom is followed by an increase in arousal and dysphoric affect, misperception of time, and desire to disengage from the current task (Westgate & Wilson, 2018). For example, drill exercises in math, grammar, or some other school subject can lead to this kind of boredom. Another type of boredom arises when a person is exposed to understimulation or overstimulation, that is, when demands and cognitive resources do not correspond. In school, this kind of boredom occurs when the teacher introduces a topic too slowly (for most skillful students) or too fast (for less skillful students)

In school, boredom arises when students perceive a lack of meaning in lessons and content they learn, and when activities do not raise a sufficient level of attention. Studies show that boredom is accompanied by both low and high

arousal states (Chin et al., 2017), in both understimulating and overstimulating situations, that is, when it is very easy or challenging to sustain attention (Westgate et al., 2017), and when the situation is subjectively meaningless. Boredom informs us that we are not able to pay attention to what we are doing and/or that the situation is meaningless. This means that deficits in either attention or meaning are sufficient to cause boredom.

Another important line of theorizing about boredom discusses cognitive appraisals and these are relevant because they enable us to understand the setting in which boredom occurs (Tam et al., 2021). Van Tilbourg and Igou (2017) demonstrate that the appraisal profile of boredom can be described as having a lack of meaning, lack of perceived challenge, and low attentiveness, while Pekrun et al. (2007) stress that boredom is characterized by low perceived control over the activity and its outcomes, and their low perceived value which explains why boredom can "sabotage" academic achievement.

The Boredom Feedback Model (BAM) tries to integrate antecedents (inadequate attentional engagement), experiences of boredom, and their consequences in a feedback loop of attention shifts (Tam et al., 2021). The model proposes that boredom arises when there is a discrepancy between desired and actual levels of attentional engagement. When a person is bored, they can shift their attention to an unrelated stimulus, turn inwards (mind wandering, self-reflection), and/or return to the source of boredom, and these attention shifts are the motivational force driving people to pursue some other activity that is more meaningful, fulfilling or satisfying. These attentional shifts function as a feedback loop serving to diminish boredom. When the feedback loop fails to provide regulation of the state of boredom, that is, when people are stuck in the loop for a prolonged period of time it may result in boredom proneness (Tam et al., 2021).

In educational literature, Pekrun proposed a control-value theory of academic emotions (Pekrun, 2006). His theory provides an integrative framework that enables analyzing the antecedents and consequences of achievement emotions. Achievement emotions are related to achievement setting, activities, and outcomes. Pekrun's position is that a multi-component approach in studying emotions is fruitful, where emotions have affective, cognitive, physiological, motivational, and expressive components. According to control-values theory, the subjective value of the academic task and subjective control over the task are key factors influencing the experience of boredom. This means that boredom is experienced during an

academic-related activity that is perceived as having a lack of value leading to a lack of meaning, which is coupled with either an overwhelming high control or lack of control over the achievement task, leading to the lack of attention (Pekrun et al., 2007; Tze et al., 2016).

Recently, Furlong and his associates (2021) proposed a School Boredom Mindset as a conceptual framework in which we should investigate boredom in school. Namely, this concept identifies characteristics of high-risk students and offers school practitioners resources to help students combat boredom in the classroom. School Boredom Mindset encompasses feelings of boredom and attitudes and beliefs toward school (i.e., school valence). Those students who experience high boredom and at the same time have negative feelings and attitudes toward school together are those who are at the risk of suffering low scholastic achievement and diminished well-being.

Coping with Boredom and Implications for Educational Practice

Studying emotions in the educational context is relevant for at least two reasons. Current emotional state affects students' engagement, motivation, and interests, and it also influences the social climate in the classroom and schools (Ainley et al., 2005; Frenzel et al., 2007; Meyer & Turner, 2002; Pekrun et al., 2002). Another important reason for studying academic emotions is that emotions are pivotal for physical and mental health, which in turn is related to academic success. Control-value theory proposes that teachers and other relevant participants in the educational process are important for fostering positive and preventing negative academic emotions in students (Pekrun, 2006). Namely, if the perception of competence and control over academic achievement is nurtured and fostered in students, it results in more positive and less negative academic emotions. Students can gain a sense of control in the academic context if the quality of instructions and assignments is raised. That means that higher clarity and structure of instructions during the learning process can contribute to perceived control. Empirical evidence shows that lower achievement pressure, which assumes increased subjective control and decreased stressing of the extrinsic value of studying and achievement, correlates negatively with boredom in a classroom (and anxiety and anger) and positively with enjoyment and pride (Frenzel et al., 2007).

In addition, if task demands are matched to individual abilities and competencies it influences how student value school tasks, and results in lower boredom. The same theoretical framework also proposes that teachers, parents, and peers should foster positive values of academic engagement and achievement and that this could be done via promoting enthusiasm in dealing with academic material and content, and by offering learning materials, tasks, and classroom interaction that meet students' needs. Furthermore, creating a learning environment that supports autonomy and cooperation has a positive effect on nurturing positive academic emotions. If students perceive the learning environment as adequately challenging, negative academic emotions, such as boredom, hopelessness, and anxiety would be less present.

Sometimes, boring activities cannot be avoided, and both students and teachers can influence the way situations will be perceived and coped with. Literature offers a classification of students' strategies for coping with boredom (see Nett et al., 2010). Authors distinguish two dimensions: the first dimension identifies the focus of the coping strategy and based on this dimension, strategies can be classified as either approach or avoidance oriented. The second dimension differentiates between cognitive and behavioral coping (Tze et al., 2013).

Approach strategies, either cognitive or behavioral assume active involvement in trying to resolve the problem. Cognitive approach coping strategies assume changes in the perception of the situation by thinking differently. For example, if a student values a certain task highly, thinking about its value and potential benefits might lower the perception of the task as boring. The behavioral approach strategy implies that a student tries to change the situation. For instance, if a certain task is boring for a student, they might ask the teacher to give them some other task that would be more suitable for their interests, abilities, and skills. Cognitive avoidance strategies assume that students try to occupy their minds by thinking about something more interesting. To illustrate this, when engaged in cognitive avoidance strategy, students might start thinking about some other activity other than the current task which is evaluated as boring. When using behavioral avoidance strategies students distract themselves simply by doing something else. To give an example, when working on a boring math task, a student can simply start playing a video game on a smartphone, or start talking to another classmate. Among these strategies, empirical findings suggest that the most efficient strategies in reducing boredom are those that reinforce the value of the

situation/task. Avoidance strategies are considered the least effective in reducing boredom (see Nett et al., 2010; Tze et al., 2013).

So far, empirical evidence has shown that characteristics of teaching are related to emotions students experience while in the classroom. Among relevant characteristics are teachers' instructional behaviors, the way teacher provides feedback to students, achievement pressure, and the level of expectation (Goetz et al., 2013). For example, if a teacher provides instructions at a fast pace it can provoke helplessness and anxiety, and a perception of lack of control in students. Or students' perception that their teacher has a high level of expectations (which means that students are over-challenged) can lead to a lowering of student enjoyment and increasing anxiety, anger, and boredom.

Finally, we should also mention school mental health practitioners, i.e., psychologists, and their role in combating boredom in students. The Student Boredom Mindset framework proposes that several lines of action can be taken to respond to boredom experienced in school (Furlong et al., 2021). The first line of action assumes that all participants in school life should offer differentiated support to students. It means identifying students who feel bored, recognizing negative emotional states (like sadness, anxiety, depression, etc.) in bored students, helping students apprehend those emotions and talking with students openly about their feelings and attitudes, talking about boredom, and through those actions offering them "tools" that could help them convert aversive emotional states into more positive and productive ones. The second line of action deals with a follow-up of the students who reported chronic boredom experiences. These follow-up activities can help determine how to support these students the best, and why they are reporting boredom (it could be that a student is actually feeling sad or anxious, but these feelings are not socially acceptable by peers, thus making student report that they feel bored as it is considered more socially acceptable by peers). School mental health practitioners should also pay more attention to the mental health status of students. The third line of action is focused on students with more chronic or pervasive boredom experiences (boredom that spans across various life contexts). These students are amongst the most vulnerable because they demonstrate the lowest well-being and highest emotional distress. Applying cognitive-behavioral approaches that could help them understand that their emotional states (boredom and other negative emotions), thoughts, and behaviors are interrelated is among recommended practices. Moreover, students

experiencing chronic and pervasive boredom benefit from mentoring practices, and check-in/check-out interventions that lower absenteeism and increase motivation (Bruhn et al., 2014).

CONCLUSION

Empirical findings suggest that boredom in school should be taken very seriously as its consequences can be very serious. Additionally, we should acknowledge that even when teachers are motivated to alleviate boredom in the classroom by using interactive, interesting teaching methods and stimulating lessons, students still may perceive school activities as boring.

Based on theoretical considerations and empirical evidence, cognitive adaptive coping strategies are probably the most efficient as they influence the perception of the value of the subject, lesson, or task. Behavioral adaptive coping strategies should be very effective in the reduction of boredom in the classroom, but teachers must pay attention to what students would like and be receptive to their suggestions. In other words, if students are bored and start doing some other activity during class, teachers should not be offended by students this' behavior, rather they should acknowledge that students might need some other activity to cope with boredom.

However, teachers should discourage students from using avoidance strategies as these tend to be related to maladaptive outcomes. These strategies are more frequently employed when students do not have a good "interlocutor" on the other side. If students do not discuss with their teachers what they find boring, if boredom is taboo, students will be more prone to use avoidance coping strategies.

The important positive role school psychologists might have in aiding students in overcoming boredom should not be neglected. Lines of actions that were described, and that are available to them are extremely important, as psychologists together with teachers could help students tremendously in combating boredom and other negative (academic) emotions.

Overall, what we can conclude is that students, teachers, and school mental health professionals share the responsibility for boredom in the classroom. Thus, all parties should be involved in finding adequate solutions for lowering boredom

in school. Studies on boredom in the classroom are increasing, but collaboration between researchers and practitioners (teachers and other relevant participants in school life) is essential for the design and implementation of prevention and intervention strategies and programs that can help in the reduction of boredom.

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CLASSROOM PRACTICE AND STUDENT MOTIVATION*

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Abstract. Motivation to learn is a very complex and dynamic phenomenon, which depends on the situation or context in the classroom and school. This paper analyzes various theoretical approaches and empirical findings on student motivation and actualizes important didactic-methodical points of support for developing motivation in classroom practice. It starts from the assumption that the teacher's understanding of the student's motivation for learning can be considered within the framework of the "meanings" that arise between the teacher's conception of teaching and the learning process, as well as the way in which they observe their own role in that process. Supporting teachers to learn and reflect on motivational theories and strategies can, in the long run, lead to changes in their motivational beliefs as well as to improving classroom practice. Although many questions related to this problem are still open, the paper concludes that teachers' actions designed as continuous, planned and systematic dealing with the motivational side of school learning can represent a significant potential in developing motivation for learning, as well as a way to improve many educational and educational solve problems at school more successfully.

Key word: student motivation, teacher, teaching, classroom practice.

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INTRODUCTION

Contemporary understanding identifies learning motivation as part of teaching, with beliefs about students' learning abilities and expectations being important determinants of the teaching practice (Good & Brophy, 2000; Hattie, 2009). In class, the teacher creates optimal learning situations that acknowledge and encourage students' cognitive potentials as well as students' motivation (Assor et al., 2002; Reeve et al., 2004; Reeve & Jang, 2006). Teacher's beliefs, practices, and attitudes are crucial for understanding and improving educational processes. They are closely related to teachers' strategies for dealing with everyday professional challenges as well as their general well-being. Furthermore, they shape the learning environment for students and influence student motivation and achievement. Research has shown that teachers' influence needs to be considered within the framework of the *meanings* that arise between the teacher's conception of teaching, the learning process, the syllabus and the curriculum, the way teachers set student achievement criteria, and the way they view their role in the teaching and learning processes (Hattie, 2003; Hattie, 2009). A perspective that focuses on what teachers believe and do in practice (Nespor, 1987; Pintrich, 2004; Pintrich & De Groot, 1990) is based on the assumption that beliefs are the best indicators of decisions that individuals make during their lifetime (Bandura, 1993). Accordingly, since beliefs and conceptions constitute a group of constructs that describe the structure and flow of the thought process of a teacher's individual subjective knowledge, they define and concretize the teacher's actions (Pajares, 1992; Turner et al., 2009). Some authors focus on teachers' knowledge, conceptions, and beliefs, considering them to be the essence of everyday activities in teaching (Fives & Buehl, 2008; Munby et al., 2001), while others analyze and interpret effective teaching practices and strategies in the classroom, without considering their meaning or what teachers want to achieve through certain activities (Turner et al., 2011; Woolfolk & Hoy, 1990).

Quite often, teachers' motivation, the logic of their actions, and the principles they apply in practice are not reflections of special, specific knowledge (Turner et al., 2011). Instead, reasons for certain behaviors in practice may lie in institutionalized routines (e.g., excessive use of instruction in classroom management), the dominance of textbooks and standardized tests, or widespread beliefs in the school culture. Along with students' own teaching-related experiences (Pajares, 1992),

these conditions also influence teachers' beliefs about motivation. Commonly, teachers rely on extrinsic incentives to engage students, assuming that ability and motivation are absolutes (Weinstein et al., 1995) rather than subject to change (Dweck, 2000). For this reason, teachers believe that some students are "not motivated" to learn and are unlikely to change (Cherubini et al., 2002). However, when provided with an opportunity to learn and think about motivational theories and strategies, teachers can also change their motivational beliefs and practices. This is evidenced by the results of a study that surveyed middle grade teachers' beliefs and practices related to motivation in mathematics (Turner et al., 2011). The results of the research showed that the support provided by certain strategies (for example, supporting students' competencies, sense of belonging, and autonomy) led to a change in the practice of individual teachers and familiarization with new techniques for motivating students, while also stimulating reflection, discussion, and learning with colleagues. The authors highlighted self-efficacy assessment as a significant factor contributing to changes in teachers' practice. Furthermore, they particularly emphasized the need to contextualize motivational strategies for specific subject areas and provide appropriate support that would allow teachers to make conceptual changes (Turner et al., 2011).

Motivation for learning is a highly complex phenomenon. The aim of this chapter is to call attention to the diversity of theoretical approaches and empirical findings about it, as well as to actualize significant didactic-methodical support points in the development of motivation in school. The first segment is dedicated to an overview of current knowledge about student motivation. In addition to considering the characteristics of motivation, we discuss the adequate influence of the school and teachers, having in mind that teachers play a vital role in increasing students' learning through motivational support. The second segment summarizes relevant research results obtained in schools across Serbia, including findings on teachers' perception of motivation for learning, current ways of motivating students, and the link between student achievement and motivation for learning certain subjects. All these insights allowed us to more precisely identify and concretely articulate differences in the perspectives of teachers and students. The common denominator for all the selected studies is contained in the understanding that teachers influence student motivation with everything they do in class: the way they communicate, the emotional climate they create, their choice of didactic-methodical solutions, and their methods of assessment. This suggests that it is

necessary to develop awareness among teachers about their importance and role in motivating students and the possibility of changing those conditions. In the final segment, we offer some concluding remarks regarding motivation in the context of pedagogical importance for both students and teachers, with a special focus on the development and modification of teachers' motivational beliefs and practices.

THE COMPLEX NATURE OF MOTIVATION AND DIFFERENT APPROACHES TO ITS STUDY IN SCHOOL PRACTICE

Researchers and practitioners increasingly recognize that motivation is "an important quality that permeates all aspects of teaching and learning" (Schunk, 1996; Schunk & Zimmerman, 2012). The term "motivation" is also used to explain the driving force, its direction and intensity, persistence, and quality of behavior, especially behavior aimed at achieving a certain goal (Brophy, 2004, 2015). Motivation can be found in different quantities, that is, different degrees of expression. At the same time, there are qualitative differences in motivation, precisely due to the complexity of its structure and the multitude of components it comprises. Individuals differ not only in the level of motivation (intensity of motivation) but also in the type or quality of motivation (Ryan & Deci, 2000a, 2000b).

Student motivation in the classroom reflects both intrapersonal and interpersonal processes (Turner & Patrick, 2004). The intrapersonal aspect of motivation refers to how students cultivate personal orientations and beliefs that influence their motivation and success (e.g., interest, achievement goals). The interpersonal segment pertains to the quality of the teacher-student relationship, that is, the commitment and support the teacher offers to the student (Eccles & Midgley, 1989; Tomás et al., 2020; Turner et al., 1998; Wang, 2009). At primary school age, effort, persistence, and interest in school activities are particularly valued characteristics of motivation for learning that influence the teacher's evaluation of students (Hamre & Pianta, 2001). And precisely at that age, during primary and secondary school, research has identified a progressive and significant decline in intrinsic versus extrinsic motivation (Harter, 1981; Harter & Jackson, 1992; Tzuriel, 1989). Such a situation is not surprising, given the increasing use of extrinsic constraints and incentives in many classrooms and the increasing importance that

schools and students attach to marks and test scores in higher grades (Eccles & Midgley, 1989; Lepper et al., 2005). Furthermore, research has revealed a progressive decline in children's commitment to school work, their enjoyment in academic, but not in non-academic activities (Sansone & Morgan, 1992), their pursuit of learning goals (Anderman & Midgley, 1997), their evaluation of effort, their perceived competence (Eccles et al., 1999), their ratings of the usefulness and importance of school, and their behavioral mastery of challenging tasks. Similarly, studies have found developmental declines in overall academic intrinsic motivation and particularly marked declines in the content areas of mathematics and science (Gottfried et al., 2001). Authors warn that the established lower levels of intrinsic motivation for older compared to younger children constitute a real social problem (Lepper et al., 2005). Not only do children lose their enjoyment in the learning process itself, but the system of extrinsic incentives and constraints that schools apply to maintain student motivation does not effectively compensate for the decline in intrinsic motivation.

The following text provides an overview of relevant research in Serbia with the aim of gaining a broader insight into the study of the phenomenon of motivation in the current school practice. The selected literature includes different constructs of motivation, studied with different methodologies, based on different theoretical designs, and investigated on samples of primary and secondary school students.

On the one hand, starting from the complex relationship between teachers' practices and their beliefs about the nature of motivation and learning, we look at the results of research focusing on the teacher and different motivational strategies that include the organization of teaching and the application of different teaching methods. In our analysis of research on the situation in Serbia, we start from the question of how teachers contemplate the phenomenon of student motivation, which is embedded in a space constructed by teachers and populated by teachers' personal beliefs about the learning and teaching processes. We further explore the questions of what motivational strategies teachers apply in class and how student motivation can be improved within the class context.

On the other hand, we present findings based on the TIMSS survey, focusing on the relationships between the components of student motivation and achievement, which were measured in different ways and different theoretical frameworks. In the most recent TIMSS research cycles, the selection of statements in the questionnaires relied on theories of motivation to a greater extent and

contained psychological constructs, including specific motivational variables. Each of them was operationalized as a separate scale with a large number of statements. Hooper and colleagues drew on self-determination theory to describe the motivation construct that was applied in TIMSS 2015 and 2019 (Hooper et al., 2013; Hooper et al., 2017). As motivation is a latent construct and cannot be directly observed, the results of the TIMSS survey represent an important source of data. Indicators include students' perception of their own ability to learn mathematics and science, their interest and enjoyment in learning these subjects, and the value they attribute to them.

Key Findings of Research in Serbia

Two related studies (Radišić, 2013; Radišić & Baucal, 2015) that analyzed the typical practices of mathematics teachers in secondary schools showed that it was possible to single out latent dimensions around which teachers' beliefs about teaching and learning were organized. Based on the registered conceptions of teaching and learning, teachers' sense of self-efficacy, and dominant teaching practices, the studies identified four types of teachers: "laissez-faire", "traditional", "traditional with a good atmosphere", and "modern". Teachers labeled as "laissez-faire", are not successful in terms of discipline in their classroom and very rarely implement activities aimed at structuring the lesson, as well as activities related to the atmosphere in the classroom. The dynamics of the class are often completely broken and the teacher's communication is dominant. In the group called "traditional teacher", the teacher dominates the conversation, and the students follow the instructions. The teacher asks questions, expecting an assumed correct answer. There is a working atmosphere in the classes, but the students' work is reduced to copying from the blackboard. Teachers who belong to the group "traditional with a good atmosphere" primarily establish discipline in the class, and the rules of behavior are respected. These teachers respect the students and show some flexibility in working with them. A group of teachers called the "modern type of teacher" often uses practices aimed at student participation and creating an atmosphere in the class. These teachers primarily show flexibility in their work, encouraging student participation in class. Students can ask questions in class and the teacher encourages students to find the answer independently (Radišić, 2013; Radišić & Baucal, 2015).

On the one hand, these findings shed light on the frequent application of practices focused on student participation and creating an atmosphere. On the other hand, they revealed a modern set of beliefs about teaching. Another significant finding referred to the use of structuring practices in the classroom and high self-confidence in maintaining discipline in the classroom. It was found that teachers with more traditional conceptions of teaching and learning were less inclined to involve students in the learning process or create a positive atmosphere in class. Conversely, the closer the set of beliefs about teaching and learning was to the modern set of beliefs, the more student participation and autonomy were supported.

Our analysis of scientific sources on motivation in the context of academic learning and development revealed a lack of a sufficiently integrative and comprehensive approach to motivation for learning, which points to the need for further research in this area. We further identified relatively subtle differences in understanding, arising from different definitions of motivation for learning as well as different methodological approaches used in research. An extensive study carried out on a sample of primary school teachers and students in the wider area of Belgrade aimed to identify the meanings that teachers attributed to motivation and map teachers' attitudes toward procedures for developing students' motivation for learning (Lalić-Vučetić, 2016; Lalić-Vučetić, 2019). The emphasis was on the pedagogical aspects of the problem of motivation in school learning. The research sample included primary school teachers and the aim was to examine how they perceived the importance of motivation for learning and what actions they used to stimulate student motivation in class. A factor analysis was conducted and several dimensions were extracted. First of all, teachers emphasized the possibility of developing motivation, which required teachers to invest efforts in their learning and improvement. When fruitful, these efforts could lead to changes in teaching. This dimension was saturated with statements that explained that teachers' personal responsibility and initiative and students' curiosity and interest in learning were crucial for success in developing motivation. The respondents recognized the importance of a research approach to teaching, supporting student autonomy, student teamwork, and strengthening student competencies. They emphasized humor in teaching, which they found to contribute to creating a positive learning environment. According to research findings, teachers believe that the phenomenon of motivation is accompanied by emotions, joy, and enthusiasm for

new knowledge, that intrinsic motivation forms the basis of satisfaction in work and student learning and progress in class; and that intrinsic motivation affects creative task solving (Đerić et al., 2012; Šefer, 2005) as well as the process of understanding the learning content.

Moreover, teachers in the examined sample emphasized the dimension of teacher-student interactions, with teaching as the framework for these interactions. In this context, motivation is understood as a series of direct and indirect connections between teaching methods, teacher personality, and teacher-student communication, which is a combination of various factors that contribute to the development of motivation (Lalić-Vučetić, 2016).

Accordingly, within the broader dimensions of teachers' attitudes about student motivation for learning, items related to teachers' self-assessments of the frequency of student autonomy, initiative, and problematic approaches to teaching were isolated. In such designed learning situations, the teacher aids and supports the learning process and encourages students to design and express learning strategies that are directly related to engagement in tasks and developing internal motivation for learning. It can be said that teachers who adopt this approach usually cooperate with others, they are open to different and new experiences, and they strive to encourage the initiative and engagement of students. In contrast, according to the abovementioned research, there are attitudes that are characteristic of rigid teachers who do not support different ways of working in class and believe that their main task is to implement the curriculum, not to develop students' motivation for learning (Lalić-Vučetić, 2016).

In the next dimension, what emerged was the idea of a teacher who is in charge of creating the conditions and environment for the realization of existing student motivation. It can be said that the primary role of a teacher is to create a psychologically stimulating environment that incites learning, provided that students' individual characteristics are taken into account, especially in terms of the choice of topics, the way that topics are covered, and the availability of various interesting materials for students to use. All of this should aid the awakening of the motivation that the student already has. In other words, the teacher's task is to guide, monitor, and support the learning process while providing conditions for the realization of the subject curriculum (Lalić-Vučetić, 2016).

In addition to the mentioned aspects of teaching, a dimension related to the description of the degree of student motivation in teaching was also isolated.

Teachers described several student behavior patterns that supported low motivation or the complete absence of motivation. Students who exhibited these patterns came to class unprepared, postponed learning, perceived learning as separate from everyday life, and were not used to delving into the material and thinking. Teachers believed that the main reason for students' lack of interest in learning was the emphasis on learning lessons and retelling, which indicated a formal attitude towards teaching and the absence of challenges and interesting content. Furthermore, research results (Lalić-Vučetić, 2016) showed that students' lack of interest in learning was linked to behavior that disrupted discipline in class. Overall, students were not motivated to learn in class and mostly focused on their grades. This research highlighted one of the major problems in teaching and the school system, which refers to students' interest in grades rather than knowledge. Assessment is formalized and aimed at encouraging extrinsic motivation.

A few years later, a study was carried out that included a sample of primary school teachers and students from Serbia, the aim of which was to explore the current practice of encouraging learning motivation in the teaching process through the planning and organization of teaching, the application of different forms of work organization, effective teaching, modeling, and the use of information technologies. Based on the results of this research (Bojović, 2017), we can identify certain actions and solutions that have the greatest motivating effects on students: (1) Student tasks and activities that are interesting, stimulating, and diverse; (2) Student autonomy and their taking responsibility for learning; (3) Effective teaching with clear and detailed instructions for solving class tasks, asking questions, and giving students feedback on their learning progress; (4) Student evaluation and learning progress; (5) Cooperative learning; (6) Individual work; (7) Modeling as a way of demonstrating different content and skills of students and teachers; (8) The use of information technology (IT) in teaching to prepare teaching materials for students. Moreover, the findings suggest that different motivational procedures encourage students to varying degrees and that a large percentage of students show indifference when it comes to certain procedures (Bojović, 2017).

The author of the aforementioned research assumed that primary school students were partially motivated to learn. The results of the research confirmed this hypothesis and indicated that students believed they could achieve their goals through self-efficacy. Students also exhibited high levels of self-perception of competencies, that is, they highly valued their task-related abilities and

competencies. They also highly valued self-determination, that is, the feeling of freedom while doing interesting and important activities. The least valued was self–worth (i.e., students' views of their qualities), with just over a half of the maximum number of points (Bojović & Antonijević, 2017, p. 17). This research highlighted the need for knowledge of the teaching process, forms of organization that encourage student motivation, new motivational strategies, and beliefs about positive motivation among students. The authors further noted that the results of the research triggered significant reflections among teachers regarding their role in creating a teaching process that would encourage students.

The small body of research into the application of innovative models in teaching and teachers' reactions includes the prominent example of a study carried out within the Trolist project. The research included the development of a professional training program for teachers and the creation of conditions for the development of divergent thinking, initiative, and cooperative behavior among students. It encouraged teachers to use cooperative learning methods, open-ended tasks, games, research work, critical dialogue, and project work in class (Lalić-Vučetić et al., 2018; Šefer et al., 2012a; Šefer et al., 2012b). The authors concluded that the successful implementation of innovations in teaching was influenced by the previous knowledge and experiences of teachers and their implicit pedagogical beliefs (Džinović, 2017; Vujačić et al., 2017). The results showed that during the process of introducing innovations into the teaching process, teachers' implicit beliefs changed through interaction with colleagues and facilitators. Teachers were increasingly motivated and more efficient in their work. They cooperated with colleagues more often and used more teaching methods in class, while students showed greater engagement in class, a better quality of knowledge, and a higher degree of motivation (Džinović, 2017). The study yielded the significant finding that the change in approach to learning created conditions for motivation, autonomy, and self-organization of students at the group level, in which the teacher played the role of the mentor and coordinator of activities (Lalić-Vučetić et al., 2018). Such organized and well-designed teaching process creates conditions for students to develop an awareness of their learning through different phases of work and to monitor and manage it. Teachers estimated that students were dedicated and persistent in completing the tasks and that they were more motivated to learn when classes were organized this way, suggesting

that this form of work organization should be reimplemented or applied to other areas and subjects.

As a special advantage of this approach, the teachers highlighted students' interest in group work, role-play (dramatization), critical dialogue, and research work. Teachers explained that the degree of student motivation increased with the time spent on activities, which was encouraged by the freedom of choice and the initiative of students. Students understood the meaning and importance of what they learned in class and during preparatory activities. They had the opportunity to talk to the teacher and to agree with their peers. In this way, they showed responsibility for the task assigned to them and towards the group they represented. No teacher mentioned grades and each step in the process of task completion represented a reward in itself. The application of research work, critical dialogue, and games in teaching emphasizes the importance of challenges, unpredictability, and uncertainty in activities. Furthermore, intense experiences accompanied by strong emotions constitute the basis of learning and a source of motivation (Lalić-Vučetić & Gundogan, 2015).

TIMSS research in Serbia as a source of data on student motivation. Motivational variables are considered to be important predictors of achievement as well as important educational outcomes. When it comes to the connection between motivational constructs and student achievement in science and mathematics in Serbia, research has shown that there is a strong relationship between students' academic self-concept and their achievement in mathematics and science (Džinović & Vujačić, 2017; Hooperet al., 2017). For example, an analysis of the data obtained in the TIMSS 2015 survey revealed that there was a relatively high correlation between fourth-graders' sense of self-efficacy and their motivation to learn mathematics. Namely, a higher level of self-efficacy was accompanied by a higher level of motivation to learn (Lalić-Vučetić & Mirkov, 2017).

Both in Serbia and in other educational systems, research has shown that clusters with the highest values of motivational variables were represented by a relatively small percentage of students. The application of the student-centered approach showed that among students from Serbia, there were three motivational profiles in mathematics, with the smallest number of students exhibiting extremely high levels of intrinsic motivation and perceived self-efficacy. Approximately equal numbers of students were encompassed by two profiles characterized by high and moderate/low values of motivational variables. When it comes to the connection

between motivational profiles and achievement, it has been shown that a higher level of motivation is accompanied by a higher level of achievement in mathematics (Lalić-Vučetić et al., 2021).

These results indicate the importance of respecting the different motivational profiles of students and the need to coordinate teaching strategies aimed at strengthening students' mathematical competencies and developing students' self-confidence in solving mathematical tasks. Student motivation for learning can be significantly improved with the application of strategies for encouraging students' beliefs, such as connecting mathematics with everyday life, encouraging autonomy and actively involving students in class work, using real situations and problems, applying problem-solving methods, and discovering the relevance of mathematics in everyday life situations, along with student self-assessments. Shifting the focus from a practice in which teachers try to get students interested in mathematics and help them understand the value of mathematics in everyday life to a practice in which teachers help students become competent in mathematics is set as a teaching goal that should lead to the encouragement of intrinsic motivation (Lalić-Vučetić et al., 2021).

TOWARDS THE IMPROVEMENT OF THE TEACHING PRACTICE

Viewed in the light of motivational research, guided largely by self-determination theory, it is considered that the improvement of education quality hinges on the promotion of conceptual understanding and flexible use of knowledge in the school context, that is, the stimulation of certain kinds of motivation in students. When applied to the realm of education, self-determination theory primarily relates to encouraging students to show an interest in learning, value education and to feel confident about their own capacities and attributes (Deci & Ryan, 1985; Deci et al., 1991).

For teachers to ensure the practical effects of certain motivational procedures, it is necessary to have a common understanding of the concept of motivation and an alignment of the expectations of students and teachers regarding the effectiveness of these procedures. Numerous learning situations can contribute to the reduction of motivation for learning or a permanent aversive attitude towards activities, content, and school in general (Harter & Jackson, 1992; Gottfried et al.,

2001; Lepper et al., 2005; Tzuriel, 1989). Therefore, it is important to establish cooperation between students and teachers, so that students could get a sense that teachers give them a degree of autonomy, set appropriate demands, and gladly help and support them in their efforts to acquire important knowledge and competencies. Likewise, it is important for teachers to be aware of the "challenge" of other content and activities outside of school and make joint efforts to direct motivation and connect knowledge with student experience, so that students could build new knowledge, reshape existing knowledge, and apply what they have learned in practice.

From the teacher's perspective, motivation is understood as a dynamic, ambiguous phenomenon, in contrast to the quantitative view that assumes that students are either motivated or unmotivated or that student motivation can be characterized in some quantitative way, between two endpoints on a continuum. Instead, this perspective emphasizes that students can be motivated in many ways; an important issue is understanding how and why students are motivated for school achievement. Motivation is not a stable trait of an individual but is more situated, contextual, and domain-specific. In other words, not only are students motivated in diverse ways, but their motivation may vary, depending on the situation or context of the classroom or school. Although this assumption makes research and assessment difficult, it means that student motivation is characterized as inherently variable and context-sensitive. As such, student motivation varies as a function of subject domains and classroom characteristics (Pintrich & Schunk, 2002).

In light of the discussed findings, schools are called upon to provide conditions for students to gradually develop competence and self-determination through learning what is interesting to them (Deci & Ryan, 1985), where autonomy is first of all seen as a continuum encompassing a range of different types of motivation. Behavior becomes more autonomous over time and this happens through the process of internalization, in which individuals seek to transform social norms and demands into their own values and regulations (Deci & Ryan, 2000). For the development of autonomous forms of motivation, three basic psychological needs must be satisfied to the greatest extent possible: the need for autonomy, competence, and connection with other people (Deci & Ryan, 2000). Furthermore, teachers' motivational styles (Deci & Ryan, 1985; Ryan & Deci, 2009) can be conceptualized along a continuum ranging from a style that is highly controlling to

a style that is somewhat controlling or somewhat autonomy-supportive to a style that is highly supportive of autonomy. Research conducted in educational contexts has shown that students who perceive their teachers as warm and supportive exhibit greater intrinsic motivation (Ryan & Grolnick, 1986; Ryan et al., 1994). This indicates that the quality of children's motivation is determined by the quality of interpersonal relationships that are realized in different contexts.

If we understand teaching as an active construction and exchange of knowledge, ideas, and experiences as well as a system of meanings, beliefs, and values between teachers and students and between peers, then based on the previous consideration of research on motivation and the context of teaching conducted on samples of teachers and students in Serbia, we can identify several prerequisites for students' successful and motivated learning: the quality of teacher-student interaction; a positive socio-emotional climate in class; emphasized teacher enthusiasm; encouragement of student autonomy; appreciation of emotions; and, finally, self-reflection and professional development of teachers.

Interaction. Learning motivation is high in an environment that contains positive interpersonal relationships (Guay et al., 2010; Wigfield & Wentzel, 2007), rich pedagogical interactions, and plenty of instructional materials. Such an environment provides comfort, order, and ensures that students feel valued, competent, respected, and valid. Such interdependence implies an atmosphere of shared responsibility, mutual respect, and a sense of personal and group identity. In the mutual influence of teachers and students and their two-way communication of high interactive connection, there is the experiential power of teaching, which engages the emotional and conative spheres of personality in addition to the cognitive and activates the pedagogical potential of the teaching content, which gives the teaching process a new quality (Bratanić & Maršić, 2004, 2005). According to the results of meta-analysis (Palekčić, 2005), the quality of teaching significantly influences student achievement (78% of the variance is explained by the teacher's competencies), cognitive and affective goals can be achieved simultaneously, and the built-up competencies of teachers hold great importance for the achievement of various educational goals. On the other hand, the literature indicates that high-performing students accept, perceive, and evaluate the teacher more positively, have a better relationship with the teacher, and exhibit higher levels of motivation for learning. Furthermore, involvement and engagement in school positively correlate with learning goals, achievement goals,

perceived ability, perceived instrumentality of the curriculum, and the classroom climate (Hardre & Reeve, 2003; Hardre et al., 2009).

Socio-emotional climate. The importance of interpersonal relationships in the classroom is also reflected in the socio-emotional climate, that is, opportunities for establishing peer-to-peer collaborative relationships during teaching activities, which affect the encouragement and increase of motivation for learning (Guay et al., 2010; Wigfield & Wentzel, 2007). The school context represents a suitable environment that should provide students with the opportunity to develop competencies, adapt constructively, find adequate solutions in different life situations, and face different challenges. There is an understanding that students need both cognitive skills and motivation to do well in school (Pintrich & Schunk, 2002). Teachers are expected to create optimal learning situations in the classroom, in which students' cognitive potential and motivation are recognized and fostered (Assor et al., 2002; Reeve et al., 2004; Reeve & Jang, 2006). In other words, teachers should teach, guide, monitor, and support the learning process. Teaching methods are chosen based on students' readiness for learning, their different learning styles, and compatibility with the learning content. Furthermore, learning is a social situation that allows students to connect and develop different quality interactions with their peers.

Teachers' enthusiasm. Teachers' commitment also contributes to strengthening student motivation. Motivation to learn is associated with student achievement and perceived efficacy in the school setting (Anderson et al., 1988; Midgley et al., 1989). However, it is also associated with the teachers' enthusiasm for the teaching process and behavior in the classroom, their commitment to work, and the efforts they invest in the planning and organization of teaching (Allinder, 1994).

Student autonomy. The relationship between students and teachers is collaborative, with an emphasis on student autonomy. Learning implies personal engagement, initiative, interaction, and exchange with the teacher and other students. Through such interaction in class, students learn to manage their learning and take responsibility for it. Within teaching partnerships, the nature of teacher-student interaction is important, as is the teacher's style of behavior that supports student autonomy (Deci & Ryan, 1985; Ryan & Deci, 2000a; Vallerand et al., 1997). Students who have a strong sense of autonomy in school show higher levels of engagement in the learning process. They are intrinsically motivated,

more persistent, and demonstrate higher achievement levels. Empirical research (Deci & Ryan, 2002; Grolnick & Ryan, 1987; Hardre & Reeve, 2003) has shown that in comparison to students with controlling teachers, students with autonomy-supportive teachers experience not only greater perceived autonomy but also more positive functioning in terms of their classroom engagement, emotionality, creativity, and intrinsic motivation.

Emotions. Research on emotions has shown that students experience a rich variety of emotions in the academic environment (Järvelä, 1995, 2001). Results have indicated that classroom emotions are significantly related to student motivation, learning strategies, cognitive resources, self-regulation, and academic achievement. Furthermore, the diversity of emotions is accompanied by the diversity of their sources. Learning situations elicit various emotions about oneself and one's surroundings that are linked to teaching tasks (Järvenoja & Järvelä, 2005). Expression, identification, and understanding of emotions are the central constructs in research on interaction in teaching and the understanding of patterns of motivation and learning. Emotions include student and teacher evaluations, action tendencies, desires, feelings, and physiological reactions. They evolve through interactions and serve as important indicators of motivation and cognition as well as signals of what is happening in the current situation or what is expected. As such, their meanings are context-bound. Research has shown that emotions are pervasive in the classroom and important for understanding instructional interaction. For example, positive teacher support involving positive emotions has been associated with students' reports of their motivation (Patrick et al., 2003; Turner & Patrick, 2004). Moreover, it has been noted that emotions, cognition, and motivation during the observation of classroom interaction are impossible to separate.

Teacher professional development. This includes intellectual, emotional, social, and other skills and dimensions and implies a continuous learning process that is necessary for improving teaching quality at the micro and macro levels (Borko, 2004; Yoon et al., 2007). In this context, teachers are active participants in reflective practice within the process of professional development (Clarke & Hollingsworth, 2002). Previous studies have shown that there is a connection between teachers' beliefs and teaching practice (Guskey, 1995, 2002). Hence, there is a need to improve the process of professional development so that teachers could enrich and perfect their professional practice and get the opportunity to

act with more initiative in the introduction and application of different types of knowledge. Some studies have shown that experiences with different teaching approaches (for example, micro-teaching, reflective teaching, and role-playing) gained during initial teacher training have a positive impact on the knowledge and teaching techniques of future teachers (Hattie, 2003, 2009).

Furthermore, teachers who recognize the importance and practicality of innovative projects express a greater willingness to get involved in them and take the initiative when implementing innovations in the future. Recent studies have shown that teachers' motivation and cognition (self-efficacy, attitudes, appraisals, beliefs, and goals) are driving forces of their workplace learning (Gorozidis & Papaioannou, 2014, 2016).

As pointed out in our research review and analysis, it is crucial to encourage teachers' responsibility for learning and their initiative to learn from problems, challenges, and successes in their daily activities. This would lead to changes in teachers' beliefs, knowledge, and behavior and thus contribute to improving the quality of students' motivation for learning as well as the results of their learning.

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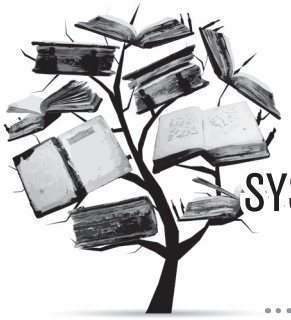

RESEARCH ON MOTIVATION IN EDUCATION: SYSTEMATIC REVIEW OF RESEARCH IN SERBIAN SCIENTIFIC JOURNALS FROM 2000 TO 2020

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Abstract. This paper aimed to provide a systematic review of research on motivation in education published in Serbian scientific journals for the 2000–2020 period. The PRISMA guidelines were followed to conduct this systematic review. By searching the relevant databases papers on motivation in education were selected from 31 journals and 102 papers with empirical studies were included in the systematic review. The papers were analyzed concerning the target population, the focus of the study, the theoretical basis from which the research started, the method of research, research design and instruments/techniques used, the school subject area/study program, and the main methodological limitations/problems identified in the analyzed empirical studies. The results of analyses showed that the number of empirical papers on motivation in education is increasing. The largest number of analyzed studies deal with the problems of motivating students of different ages, and then teachers. The most common theoretical starting points are the Theory of Self-Determination and the Theory of Achievement Motivation. Quantitative, correlational research with self-report questionnaires dominate, which primarily gave results on the level and type of motivation of students and teachers. Some basic methodological limitations or problems were observed in the considered sample of papers. There is space for expansion of research questions, primarily in the domain of intervention programs on encouraging students' motivation to learn. Also, in further research it will be necessary to strive for greater theoretical and methodological diversity.

Keywords: motivation in education, empirical studies, students, teachers, systematic review.

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INTRODUCTION

Research on motivation in education represents a link between theory and educational practice and can contribute to the development of motivation theories and improve the quality of motivation of all participants in the educational process. There is agreement among scientists that research in this area is not sufficiently represented (Liuet et al., 2016; Slavin, 2009). One of the possible reasons is the difficulty in measuring motivation (Slavin, 2009). When it comes to measuring motivation in education, difficulties arise from the complexity of the motivation construct itself (Harlen & Deakin Crick, 2003), but also from the complexity of the educational process. This complexity is contributed to by the involvement of a larger number of participants in children's education (students of several age groups from different socioeconomic backgrounds, teachers, school administration, and family), and the diversity of the educational process itself in terms of teaching content, methods, teaching tools, the environment in whichthe educational process takes place, as well as the effects of the wider social context on the education system (Carlton & Winsler, 1998; Grolnick, 2016; Koh, 2016; Liu et al., 2016; Pelletier & Rocchi, 2016; Pintrich, 2003; Stipek, 2011).

There is agreement that motivation is one of the most important factors in learning, as well as in successful teaching (Brooks & Young, 2011; Lazowski & Hulleman, 2016; Slavin, 2009; Trebješanin, 2009), and that it is also an important area of educational research (Maehr & Meyer, 1997). Motivation is related to various outcomes in the educational process, such as curiosity, persistence, learning, and performance (Lazowsky & Hulleman, 2016; Vallerand et al.,1992), which explains the interest in researching motivation in educational settings (Vallerand et al., 1992). When observing the activity of students in the instructional process, the central concept is motivation to learn. A commonly used definition of this is the definition formulated by Brophy (2004). This author defines motivation to learn as "a student's tendency to find academic activities meaningful and worthwhile and to try to get the intended learning benefits from them" (Brophy, 2004, p. 249). Also, he states that "motivation to learn is the adoption of learning goals and related strategies; it is not linked directly to either extrinsic motivation or intrinsic motivation" (Brophy, 2004, pp. 249–250). Summarizing the research findings of a large number of authors in their description of the characteristics of motivated students, Lazowski and Hulleman (2016), state "Not only do motivated students

learn more, they persist longer, produce higher quality work, and score higher on standardized achievement tests, particularly if theyare motivated by relatively intrinsic, as compared with extrinsic, reasons" (p. 604). Motivation to learn can vary in intensity and direction, (Ryan & Deci, 2000) and can also be general or specific (Vizek Vidović et al., 2014). A general motivation to learn is a permanent and broad disposition that manifests itself as a desire to acquire knowledge in different areas; it depends more on the students themselves and is the result of experience with school and learning. Specific motivation to learn is the motivation for acquiring content in a specific school subject or area and depends more on external factors such as teacher behavior and teaching content (Vizek Vidović et al., 2014).

A concept that is also mentioned in the literature in the context of learning motivation is that of academic motivation, which within the self-determination theory indicates that learning can be intrinsically or extrinsically motivated or students can be a-motivated for school learning (Vallerand et al., 1992). It is important to state that the theory of self-determination is a theoretical approach that has generated a significant amount of research on motivation in education (Deci et al., 1991; Ryan & Deci, 2000; Vallerand et al., 1992). Motivation to learn, or academic motivation (Vallerand et al., 1992) whether general or specific, can be influenced by parents and the family as a whole in addition to school-related factors (Baker et al., 1997; Shih & Change, 2018; Tam, 2009).

At the end of the 1990s, there were significant changes in the approach to motivation research in education, which is manifested in an orientation towards research that places motivation in the classroom context, under the influence of socio-cultural, situational and socio-cognitive theories (Järvelä, 2001). The results of a literature review of meta-analyses on motivation and evaluation during the teaching and learning process in the period from January 2016 to March 2021 (Sánchez-Santamaría et al., 2021) confirm this new theoretical orientation towards motivation research in context. In this review it was shown that, when meta-analyses on motivation are observed, their focus was primarily on contextual variables, self-regulation, and students' academic performance. Putting motivation research into the classroom context opened up questions of adequate methodological approaches and methods of measuring motivation (Garcia & Pintrich, 1996; Maehr & Meyer, 1997).

This paper aimed to provide a systematic review of research on motivation in education (preschool settings, elementary school, high school, and university) published in Serbian scientific journals during the 2000–2020 period. The main research questions focused on: (1) The frequency of publication of empirical studies on motivation in education in the period from 2000 to 2020, as a whole, as well as in relation to the frequency of theoretical works; (2) Methodological characteristics of empirical research concerning: (a) the target population (preschool, elementary, and high school students, university students, teachers, school staff, parents), (b) subject/aim of the study and the theoretical basis from which the research starts, (c) the method of research (quantitative, qualitative, or mixed-method), (d) research design (descriptive, causal, developmental, meta-analysis), (e) research instruments/techniques, and (f) school subject area or study program.

Bearing in mind the importance of motivation for the quality of the educational process and its outcomes (Albrecht & Karabenick, 2018; Brophy, 2004; Lazowski & Hulleman, 2016; Maehr & Meier, 1997; Pintrich, 2003; Trebješanin, 2009), we can expect that the results of the systematic analysis of research on motivation in education, published in Serbian scientific journals in the period 2000–2020, can be significant in planning the improvement of motivation in the educational system in Serbia, but also beyond.

METHOD

Literature Search and Inclusion Criteria

We used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol (Page et al., 2021) to conduct this systematic review (Fig. 1). Searching the data base KOBSON (Serbian Library Consortium for Coordinated Acquisition) identified 36 journals in the field of social-humanistic and interdisciplinary sciences relevant to education, categorized by the Ministry of Education, Science and Technological Development of the Republic of Serbia. Then, we searched the database of the Serbian Citation Index (Scindeks) and the websites of identified journals that are not in this database for the period from 2000 to 2020. By reviewing the title and abstract of the papers in the identified journals, it was determined that in 5 out of 36 journals, not a single paperwas

published in the field of motivation in education for the considered period. In 31 journals, 150 papers in the field of motivation in education were identified, which were published either in Serbian or English. In the next step, the papers were grouped into two categories, theoretical papers (review papers, opinion articles) (N = 41) and empirical studies (N = 109). Only empirical papers were included in the systematic review. After additional insight into the empirical papers, it was decided to include 102 papers in the systematic analysis (Appendix 1). Out of the total number of papers selected, 19 (18.6%) were studies by foreign authors, eight of whom were from countries of former Yugoslavia which have somewhat similar educational systems to Serbia.

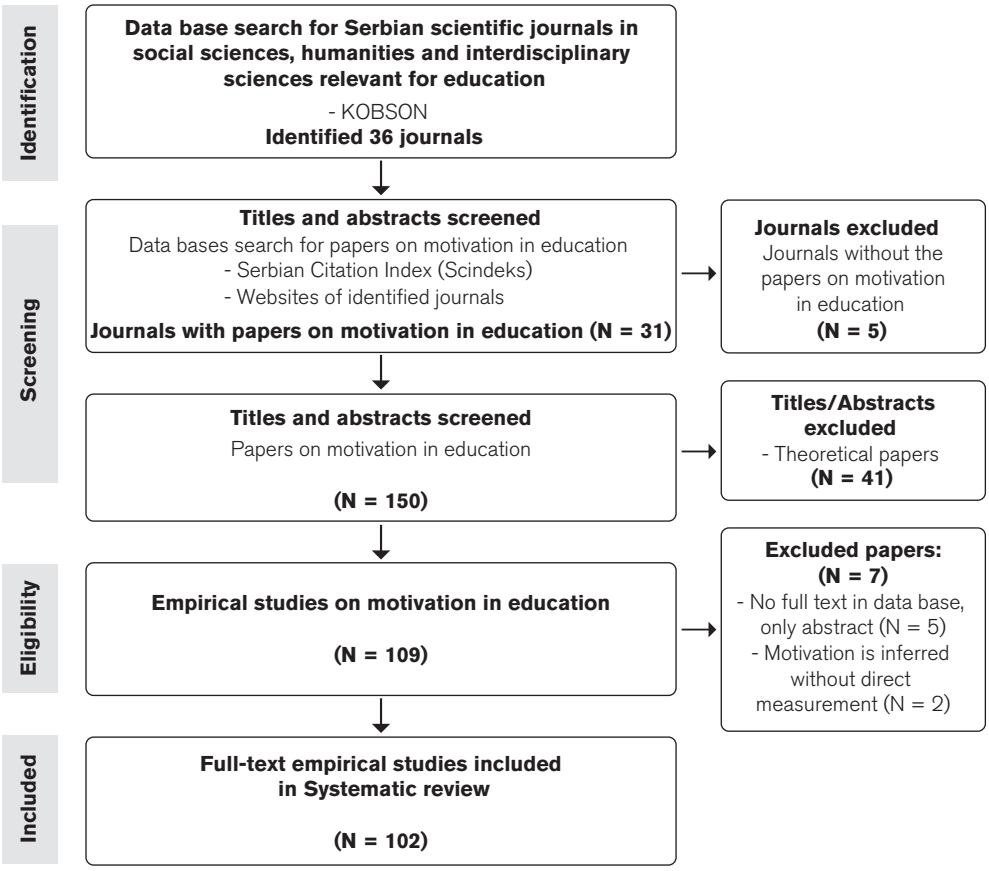


Figure 1. PRISMA flow chart

Data Extraction and Analyses

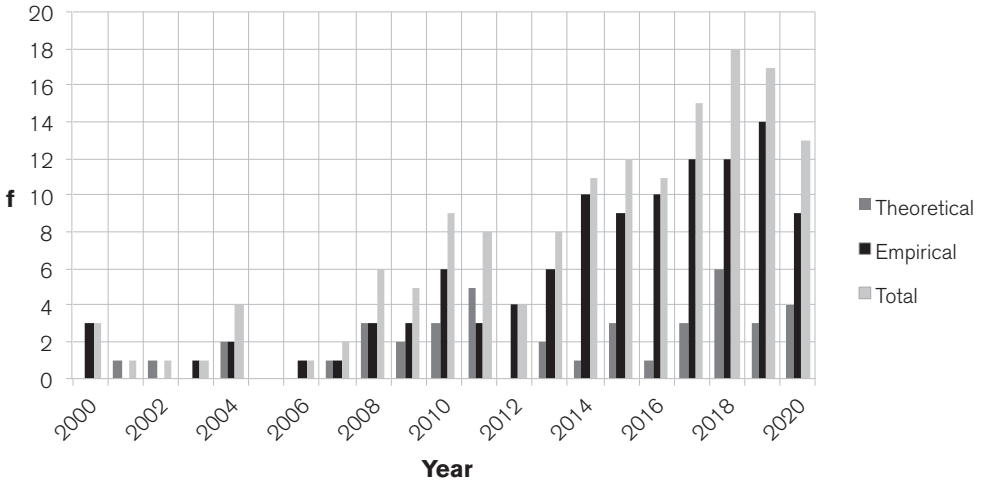
To summarize the selected empirical research, the following data were extracted and analyzed, using inductive thematic analysis (Braun & Clarke, 2006): (a) publication information (b) target population, (c) research subject/aim (d) theoretical starting point, (e) empirical research method (quantitative/qualitative/mixed method)[1], (f) study design (descriptive, causal, developmental, meta-analysis), instruments/techniques for measuring motivation in education, (g) school subject area/study program.

RESULTS

Analysis of the Frequency of Publication of Papers on Motivation in Education in the Period 2000–2020

Results regarding the frequency of publication of papers in 31 journals for the considered period are presented in Graph 1. A small production of these papers can be observed for the 2000–2010 period. In the following period, an increase in the number of papers can be observed, except for the year 2012. Most of the papers were published in the period between 2017 and 2019. This growing trend did not continue in 2020, which is understandable given the situation caused by the Covid 19 pandemic. When looking at the data on the frequency of publication of empirical articles, it is also observed that the number of these articles has increased since 2010, with some stagnation in 2011 and 2012, and with the highest production occurring between 2017 and 2019. In the period from 2000 to 2009 only 12.8% of papers of the total number of empirical papers were published, but in the period from 2010 to 2020, that percentage reached the value of 87.1%.

1 Summarizing the methodological aspects of empirical research is based on Ristić, Ž. (2011). *Kvantitativna, kvalitativna i mešovita istraživanja – metodološki aspekti* (Quantitative, qualitative and mixed research – methodological aspects). Novi Sad: Univerzitet u Novom Sadu.



Graph 1. Frequency of papers on motivation in education in the period from 2000 to 2020

Characteristics of Empirical Research with Regard to the Target Population

Table 1 shows the results of the analysis of the representation of certain categories of the target population. The results show that the most represented research was that in which the respondents are primary and secondary school students, while the research in which the participants are school staff (principal, all teachers, extracurricular staff) are represented in the smallest percentage.

Table 1. Representation of certain categories of the target population in studies included in the analysis

Target population	f	%
Elementary & high school students	45	44.1
University students	27	26.5
Teachers	18	17.6
Teachers & students	9	8.8
School staff	3	2.9
Total	102	100

What were the Subjects/Aims of the Research Covered in Analyzed Papers?

Based on the inductive thematic analysis, five higher-order themes of the research subjects/aims were singled out, and within each of them, a certain number of sub-themes were identified. The sub-themes list the key research subjects/aims within each higher-order theme. Table 2 shows the results of the research analys regarding the subject/aim of the research. The following higher-order themes were identified: (1) Type and level of motivation to learn, (2) Achievement motivation and achievement goals, (3) Teachers' motivation, (4) Enhancing students' motivation to learn, and (5) Methodological studies. It should be noted that the inclusion of certain papers in higher-order themes was to some extent arbitrary, because some papers, due to the complexity of the research design, can be classified into more than one higher-order theme.

Table 2. Representation of topics related to problems/aims of studies

Problem/Aim of the study		f	%
Higher order themes	**Sub-themes**		
1. Type and level of student's motivation to learn Papers: 1, 2, 4, 5, 6, 9, 11, 15, 17,18, 20, 21, 23, 25, 26, 28, 30, 31, 32, 34, 38, 41, 44,47, 49, 51, 52, 61, 58, 67, 68, 72, 73, 75, 78, 80, 81, 87, 88, 89, 90, 92, 96, 99, 102.	- Students' general motivation to learn. - Motivation to learn certain school subjects/ study programs, extra-curricular activities. - Motivation to learn and school success. - Motivation to learn of students with learning and development difficulties in inclusive education.	45	44.1
2. Achievement motivation and achievement goals Papers: 10, 12, 14, 35, 39, 45, 46, 57, 60, 62, 63, 64, 71, 85, 95, 101.	- Students' achievement motivation - Teachers' achievement motivation - Achievement motivation of students of teaching faculties - Students' achievement goals/learning goals (high school and university students).	16	15.7

Problem/Aim of the study		f	%
Higher order themes	**Sub-themes**		
3. Teachers' motivation Papers: 3, 7,19, 22, 24, 29, 33, 40, 50, 55,56, 59, 66, 70, 79, 82, 86, 93, 94.	- The type of teacher's motivation. - Teachers' motivationin the teaching process. - Motivation for choosing teaching profession (pre-school and school teachers). - Teachers' motivation for professional development and for changes in teaching. - Teacher motivation for work in inclusive teaching. - Motivational functions of school administration in relation to teachers.	19	18.6
4. Enhancing students'motivation to learn Papers: 8, 13,16, 27, 36, 37, 42, 43, 48, 54, 76, 77, 84, 97, 98.	- Teacher actions in enhancing students' motivation to learn (e.g., teacher communication type, support for student autonomy, the type of assessment). - The influence of modern media on students' motivation to learn. - The effect of experimental or educational programs on students' motivation to learn. - Personal and contextual factors related to motivation to learn (e.g., need for cognition, cultural factors, learning method).	15	14.7
5. Methodological studies Papers: 53, 65, 69, 74, 83, 91, 100.	- Construction of a new instrument for measuring motivation in education. - Adaptation of an existing instrument for the population of students in schools in Serbia. - Verification of the metric characteristics of the instrument on a new sample.	7	6.9

Note. The numbers refer to papers listed in Appendix 1.

Theoretical Bases in Motivation Research in Education

In one-third of the analyzed papers, the starting point is the generally accepted definition of motivation or the definition of motivation for learning (e.g., the definition in Brophy, 2004), without reference to a specific theoretical framework. In these studies, the authors are oriented towards measuring the level of motivation to learn a certain school subject or motivation for some extracurricular activity (e.g., excursion), as well as the effects of some factors (e.g., grades, verbal feedback from the teacher) on learning achievement. Theories that are substantially represented are Self-determination theory – SDT (Ryan & Deci, 2000) and other theoretical models of a narrower scope, in which the basic constructs are

intrinsic and extrinsic motivation (e.g. Harter, 1981, Lepper et al., 2005) (which are represented in 26.2%), and Achievement motivation theory (Atkinson, 1977; McClelland, 1961), and achievement goal orientation theories (e.g., Ames, 1992; Covington, 2000; Nicholls, 1984) used in 21.3% of papers.

In 8.7% of the studies, the theoretical starting point were some conceptions of the motivation for choosing a teaching profession (e.g. The Expectancy-value motivational theory, Eccles, 2002; The FIT – Choice, Watt & Richardson, 2007). In the studies in which the motivation to learn certain school subjects was examined, the starting point was the theoretical conceptions of motivation in the given subject area, but all of them were representetd with less than 5 %, (e.g., The theoretical framework for student's motivation toward science learning, Tuan et al., 2005; Integrative theories of foreign language learning, Gardner, 2001; The model of the structure of kinesiology motivation, Babiak, 2010). In a very small percentage (under 2%) the research is based on Pintrich's (1999) socio-cognitive model of self-regulated learning, within which the motivational component in the prediction of learning achievement was investigated, and Bandura's Self-efficacy theory (Bandura, 1977) as a theoretical starting point for examining student motivation.

Research Method, Research Design, and Applied Instruments/Techniques

Table 3 shows that according to the research method, the most represented are quantitative research (88.3% of papers). Qualitative research is represented in 6.9%, and mixed method research in 5.0% of papers.

Table 3. Representation of papers according to research method and research design (N = 102)

Quantitative study	**f**	**%**	**Qualitative study**	**f**	**%**	**Mixed method**	**f**	**%**
Survey	16	15.7	Case study	4	3.9	The survey, and theoretical analysis	1	1.0
Correlational	63	61.8	Thematic analysis	2	2.0	Focus group and survey	1	1.0
Comparative	5	4.9	Systematic observation	1	1.0	Survey and content analysis	1	1.0

Quantitative study	f	%	Qualitative study	f	%	Mixed method	f	%
Experimental	3	2.9				Survey with open-ended questionnaire and scaling	1	1.0
Developmental	2	2.0				Focus group and interview	1	1.0
Meta-analysis	1	1.0						
Total	90	88.3	Total	7	6.9	Total	5	5.0

Of the quantitative studies, correlational studies are the most represented (61.8%), followed by surveys (15.7%). In quantitative research, 37.4% of the instruments used to measure motivation are self-report measures, questionnaires (closed-ended with Likert scale or open-ended) and rating scales, specifically designed for certain research. In addition to these instruments, already existing instruments (questionnaires, tests, rating scales) created within the framework of certain theories of motivation adapted for application to a particular population are used (e.g., Academic Motivation Scale – AMS, Vallerand et al., 1992; The Scale for Estimating Extrinsic and Intrinsic Motivation, Lepper et al., 2005; Motivated Strategies for Learning Questionnaire – MSLQ, Garcia & Pintrich, 1996; The Achievement Motive Scale – MOP 2002, Franceško et al., 2002).

Qualitative research includes case studies, thematic analyses, and systematic observations. The analysis showed that interviews, semi-structured and structured, were mostly used as assessment methods.

In mixed-method studies, research designs encompass methodological elements of both quantitative and qualitative research, such as focus groups, content analysis, with the application of systematic observation, interviews and closed-ended and open-ended questionnaires, specifically designed for the study.

Representation of Research on Motivation for Certain School Subjects and Study Programs

Motivation to study a certain subject among primary and secondary school students and teachers are the focus of one-third of the papers (33%) (Table 4). Analysis showed that the most represented research is in the teaching of physical education, followed by mathematics, English language, and Serbian language.

Research on motivation for chemistry is present in 2 papers, with one research item each for music, education, physics, foreign languages in general, science, information technology in education, and extracurricular activities.

Table 4. Representation of studies investigating motivation in certain school subjects (N = 102)

School subject	Elementary & high school students	Teachers	Teachers and students in the same study	Total
	(f)	(f)	(f)	(f)
Physical education	8	1	1	10
Mathematics	3	1	1	5
English language	4		1	5
Serbian language	4	1		5
Chemistry	2			2
Music education	1	1		2
Physics	1			1
Foreign language	1			1
Science	1			1
Information technology in education			1	1
Extracurricular activity-School excursion	1			1
Total				34

Research on university student motivation in specific study programs (Table 5) were presented in 23 papers (22.5%).

Table 5. Representation of studies investigating motivation in certain study programsat faculties (N = 102)

Study programs	f	Study programs	f
Teachers' education	5	Chemistry	1
English language	5	Traffic	1
Psychology	3	Russian language	1
Mathematics	2	Sport and physical education	1
Preschool teachers	1	Medicine	1
Physics	1	Philosophy	1
Total			23

The analysis showed that the most researched are was the motivation of students at teacher training colleges, as well as for studying English (5 studies each). Then, there is research for psychology (3), mathematics (2), education for preschool teachers, physics, chemistry, traffic, Russian language, medicine, and philosophy, 1 for each study program.

DISCUSSION

In this systematic review, we analyzed empirical research on motivation in education published in Serbian scientific journals in the period from 2000 to 2020. The focus of the analyses was on the characteristics of selected studies (N = 102) with regard to the target population, subject/aim of the study, theoretical basis from which the research starts, the method of research, research design, applied instruments/techniques and school subject area or study program. Also, the aim was to identify the main methodological limitations or problems in the analyzed empirical studies.

The analyses showed that there was a trend of growth in the number of papers on motivation in education, with the marked dominance of empirical papers in relation to theoretical papers, especially after 2011. Taking into account the findings of scolars that prior to 2000 there was not enough research in the field of motivation in education (Slavin, 2009), the results of this review indicate a positive trend in terms of the number of research papers in this field included in journals in the scientific community in Serbia, just after 2009. A significant database of results on motivation in education has been created which can be a starting point for further improvement of practice in this area.

When looking at the target population, the largest number of analyzed studies deal with the problems of motivation to learning of different ages students (primary and high school students and university students), and then with teacher motivation. In our systematic review, it was found that there is a lack of research on preschool children. In the literature, data show that student motivation decreases with age (from elementary to high school), which certainly represents a problem in schools (see Lazowski & Hulleman, 2016). To prevent this, it is necessary to explore the motivation to learn continuously from preschool to older school ages, which would create a basis for timely procedures that would support the

development of motivation to learn (Anderson et al., 1976; Maehr & Meyer, 1997; Stipek, 2011). A negligable number of studies were devoted to gifted students and students with developmental difficulties. Research indicate that part of the gifted population does not achieve the expected success and adequate inclusion in the process of school learning, precisely because of their insufficient/lack of motivation (Altaras, 2006; Altaras Dimitrijević & Tatić Janevski, 2016; Delcourt et al., 2007; Lazarević, 2007). Thus, more systematic research in this field is necessary. In addition, research conducted on motivation to learn among students with developmental disabilities, as well as the motivation of teachers to work in inclusive teaching, is needed.

Papers in which participants/respondents are members of the school staff (principal, all teachers, and extracurricular staff) are underrepresented, and therefore systematic and extensive research into their role in creating a desirable motivational climate in the school as a whole is needed (Trebješanin, 2009). Since there is agreement among researchers that parents are an important factor in the development of their children's motivation to learn (Chew, 2016; Grolnick, 2016), it could be expected that they would also be one of the target populations more represented in included studies. However, our findings show the opposite. Namely, only in one study, through the student's assessment of parenting style, which was one of the variables in the research on the relationship between parenting styles, academic self-concept, academic motivation and academic achievement of students, were parents related to their children's motivation. Also, in several studies, the questionnaires contain a smaller number of items that assess students' opinions on the importance of parents for their motivation to learn and education.

When we take into account the fact that motivation itself is a complex construct (Harlen & Deakin Crick, 2003), frequently connected with other constructs in educational settings (whether they refer to the characteristics of students, teachers or the learning context) both in the process and in learning and teaching outcomes, it is evident that studies covering numerous research problems of motivation in education are necessary and useful (Järvelä, 2001; Lazowski & Hulleman, 2016; Maehr & Meyer, 1997; Richardson et al., 2012; Vallerand et al. 1992). The results of the analysis, in this systematic review, concerning the representation of certain *research topics/aims* showed that they are current problems in the psychology of education (e.g., Slavin, 2009; Vizek Vidović et al., 2014; Woolfolk et al., 2008). At the level of higher-order themes, the

most represented is *Type and level of student motivation to learn*, within which there is the largest number of studies related to general motivation to learn or the level of motivation to learn certain school subjects/study programs. Then, according to the representation of the number of papers, there is a higher-order theme which includes studies that investigate *the teachers' motivation* which is recognized as an important topic by educational psychologists, both at the theoretical level and in the context of the teaching process (Brooks & Young, 2011; Pelletier & Rocchi, 2016; Slavin, 2009; Woolfolk et al., 2008). The variety of research sub-themes within this higher-order theme (e.g., The type of the teacher's motivation, Teachers' motivation in the teaching process, Motivation for choosing teaching profession, Teachers' motivation for professional development) indicates the complexity and importance of researching teachers' motivation (Pelletier & Rocchi, 2016). The higher-order theme *Achievement motivation and achievement goals*, which follows according to the percentage of papers, was explored both among the population of students and teachers. There is agreement among researchers that in achievement-related contexts such as schools, achievement motivation and achievement goals are extremely important (Vizek Vidović et al., 2014; Woolfolk et al., 2008), which is certainly an incentive for further research in this area.

With almost the same percentage, research on the higher-order theme *Enhancing students' motivation to learn,* was presented. Within this theme are grouped papers related to teachers' actions in enhancing students' motivation to learn (e.g., teacher communication type, support for student autonomy), the influence of modern media on students' motivation to learn, the effect of experimental or educational programs on students' motivation to learn, and some personal and contextual factors related to motivation to learn (e.g., the need for cognition, cultural factors, learning method). All these topics are very important in preparing teachers for instruction and considerable space is devoted to them in the textbooks of the psychology of education (Slavin, 2009; Vizek Vidović et al., 2014; Woolfolk et al., 2008).

The lowest number of papers was identified within the higher-order theme *Methodological studies.* The research objectives of primary studies were related to the construction of a new, adaptation of the existing instrument for measuring motivation within the population of students in Serbian schools and verification of the metric characteristics of the instruments on a new sample. There is a need for this kind of research, especially if we look at the contemporary approach

to motivation research in education, which places motivation in the classroom context (Järvelä, 2001). It is necessary to develop reliable and valid instruments for measuring motivation that are sensitive to the educational context.

Observed at the level of sub-themes, analysis showed that there is a lack of sufficient research on certain topics, among which are, for example, those focused on the motivational climate in the context of learning, on the relationship between student motivation to learn and assessment (formative/summative), and motivation to learn among students from different socio-cultural background. Also, there is a lack of studies investigating interventions and their effects on encouraging students' motivation to learn (only two studies). The importance of studies focused on positive effects of interventions on the development of motivation is indicated in a meta-analytic study of programs based on a certain motivation theory (Lazowski & Hulleman, 2016). The authors point out that when the effects of these studies are viewed from a practical perspective, "intervention studies facilitate our understanding about which interventions are most effective in improving educational outcomes in a way that observational research cannot. This understanding can guide recommendations for educational practice based on appropriate scientific evidence" (Lazowski & Hulleman, 2016, p. 603).

Overall, the researchers of motivation in education indicate the importance of a theoretical framework existing in this field. The theoretical starting points in motivation research in education make it possible to check the adequacy of the application of a certain theory in the educational context (Lazowski & Hulleman, 2016) as well as to provide a solid basis for conducting educational practice (Maehr & Meyer, 1997). Yet, in one-third of the analyzed papers, the theoretical groundpoint were missing. In those studies, the starting point is the generally accepted definition of motivation or the definition of motivation to learn (e.g., definition in Brophy, 2004). The authors are mostly oriented towards measuring the level of general motivation to learn, as well as, for a certain school subject. Analysis of the papers in which there is a theoretical framework showed that the Theory of self-determination (Ryan & Deci, 2000), is the most represented, which is in line with the contemporary approach to motivation in educational psychology literature, as motivation in context (Brooks & Young, 2011; Järvelä, 2001; Sánchez-Santamaría et al., 2021). The theory of achievement motivation (Atkinson, 1977; McClelland, 1961) and achievement goals (Ames, 1992; Covington, 2000; Nicholls, 1984) are also represented in the analyzed papers. These theoretical

approaches to motivation in education have a long history, but they are still widely represented as a theoretical framework for researching student motivation in relation to achievement in learning (Liem et al., 2016; Maehr & Meyer, 1997; Vizek Vidović et al., 2014). Several studies are based on narrower theories intended for application in a specific teaching area (student's motivation toward science learning, motivation for foreign language learning, and kinesiology motivation).

In the papers analyzed in this systematic review, the absence of a socio-cultural theoretical framework is evident. Research that starts from the socio-cultural framework of motivation would contribute to the understanding of motivation in context, more precisely the context of learning that takes place in an educational institution. Järvelä (2001) concludes that "Conceptualizing motivation in context challenges traditional research methodology and creates a need for the development of innovative approaches, which better capture the dynamic ways in which learners and context mutually interact in real-time in the classroom" (p. 8).

The results of the analysis regarding the type of research method showed that the most represented is quantitative research. Qualitative and mixed-method research is represented in a very small percentage. However, some contemporary theoreticians, primarily those who advocate the understanding of motivation in context, point out that the use of the mixed method, which incorporates both qualitative and quantitative methods simultaneously, can enrich the theoretical understanding of motivations (Turner, 2001). In the analyzed studies, the most represented was correlational research design, which is in agreement with the dominant approach in the psychology of education (Vizek Vidović et al., 2014). Experimental research, which has great importance in research on motivation in the context of teaching, and which can simultaneously enrich theory and practice (Järvelä & Volet, 2004), is represented in a very small number of analyzed papers. Intervention studies are the best representative of the importance of experimental design in motivation research in education (Lazowski & Hulleman, 2016). In the very definition of an intervention study as "an empirical investigation that manipulated an independent variable and compared the experimental group with some type of control group" (Lazowski & Hulleman, 2016, p. 610), its experimental design is described. Developmental studies, especially longitudinal, are also represented in a very small number of papers. If we accept the opinion that "Longitudinal perspectives or analyzes over a period of time provide further insight into the dynamics of students' motivational appraisals and contextual actions" (Järvelä &

Volet, 2004, p. 196), the number of these investigations should be significantly higher.

As some authors state, for assessing motivation in classroom settings, different methods and techniques can be used, such as questionnaires, interviews, stimulated recall, and observation (Garcia & Pintrich, 1996). However, the largest number of studies analyzed used self-reports, more precisely, questionnaires (closed-ended with a Likert scale or open-ended). As Garcia & Pintrich (1996) states, self-report questionnaires, especially with closed-ended items, are widely used in research generally, due to a number of advantages (relatively easy to administer, easy and quick to score prepare for data analysis, can be used with large and different samples of respondents, which contributes to the generalizability of findings).

In this systematic review, one of the research questions related to the frequency of studies in which motivation was researched in the context of certain school subjects or study programs. The results of the analysis of specific motivation to learn showed that researchers are interested in studying motivation in the context of certain school subjects or study programs. This is in line with the viewpoint that it is important to investigate the student's state motivation, which refers to the student's willingness and desire to participate and learn in a specific context (Brooks & Young, 2011).

However, the frequency of these investigations is unevenly distributed according to subjects and study programs. Also, not all school subjects or study programs are included. These studies should be continued in all school subjects and study programs because research on specific motivation to learn (Vizek Vidović et al., 2014) can answer questions about the effects of teacher behavior or teaching content on student motivation in certain teaching areas or study programs.

Limitations of this Systematic Review

The problem of complete availability of works exists, namely not all analyzed journals are available in the Scindeks database, and the websites of individual journals are not always sufficiently informative. For papers published in certain journals, only abstracts are available which limits a complete insight into the results of empirical studies. Papers by Serbian authors published in foreign journals were not included

in the analysis. This somewhat narrows the insight into motivation research in the educational system of Serbia. Analysis of those works could be the next research task. Also, a complete qualitative analysis of the research findings was not done, which could be the next step in creating a meta-analysis for a specific problem in motivation in education.

CONCLUSION

The results of this systematic review showed that there is a significant corpus of papers in the journals of the Serbian scientific community, for the period 2000–2020, in which empirical research on motivation in education is presented. It is evident that the number of these papers is increasing, which can be significant for the development of scientific knowledge in the field of motivation in education, as well as in planning the improvement of motivation, primarily of students and teachers in the Serbian educational system, and beyond. Quantitative research dominates, which gives results primarily on the level and type of motivation of students and teachers in the teaching process. Nevertheless, there is space for further expansion of research problems, primarily in the domain of intervention programs, both their design and monitoring of their effects on encouraging students' motivation to learn. In further research on motivation in education, greater theoretical and methodological diversity in research would provide a broader basis for a better understanding of the motivation and engagement of students and teachers in dynamic learning contexts, which is in agreement with the opinions of other authors (Järvelä & Volet, 2004; Maehr & Meyer, 1997). And finally, there is a need for new systematic reviews and meta-analyses that cover certain topics about motivation in education in the Serbian education system, for which there is a sufficient corpus of relevant research results.

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APPENDIX 1.

List of papers included in Systematic review

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A REVIEW OF MOTIVATIONAL AND CLOSELY RELATED CONSTRUCTS IN PISA 2000 TO 2018

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Abstract. OECD's Programme for International Student Assessment (PISA) has become a golden standard for advancing innovative methodology in the measurement of psychological constructs relevant to education. Since its inception in 2000, PISA has produced seven cycles of international assessments with a growing number of participant countries over the years. In addition to the main assessments of reading, mathematics, and science, it assesses students' learning motivation, attitudes, beliefs, and behavioral dispositions. The selection of constructs to be included in PISA Student Questionnaire takes a couple of years and involves national and international meetings and consultations with international research communities. Thus, the chosen PISA's Student Questionnaire constructs reflect up-to-date trends about which education-related psychological constructs are practically relevant and theoretically important. In this chapter, we provide a systematic review of the constructs in the PISA 2000 to 2018 cycles that assess students' learning motivation, attitudes, beliefs, and behavioral dispositions. Our review identifies the historical importance and current status of relevant constructs (i.e., which constructs are deemed important in what year and which constructs have been dropped); and examines a range of historical constructs in PISA against the current motivational theories.

Keywords: PISA, motivation, theory, questionnaire, scale.

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INTRODUCTION

This chapter presents a systematic review of the motivation and closely related constructs employed in the Programme for International Student Assessment (PISA) from 2000 to 2018 cycles. The review (a) identifies motivation and similar constructs that were included in seven cycles of PISA. By doing so, we (b) document if there has been any change in the historical importance and status of the motivation and similar constructs (i.e., which constructs were deemed important in what year and which constructs have been dropped) and (c) relate PISA's motivational and similar constructs against the major motivation theories in the field of educational psychology. We begin this chapter by briefly introducing the PISA project.

PISA Briefly

An international project on student achievement, known as the Programme for International Student Assessment (PISA), commenced in 2000 by the Organisation for Economic Co-operation and Development (OECD). Since then, it has been conducted every three years, and produced seven cycles of international assessments with a growing number of participant countries over the years. There were 43 participant countries/economies in 2000 (student sample size N = 228,784), 41 in 2003 (N = 276,165), 57 in 2006 (N = 398,750), 65 in 2009 (N = 475,460), 65 in 2012 (N = 485,490), and 72 in 2015 (N = 519,334). The latest PISA assessment was conducted in 2018 and it involved 79 countries/economies with an international sample size of around 600,000 students, representing some 32 million 15-year-olds around the world. Thus far, 88 countries and economies have participated in PISA at least once. The PISA project is based on students of a specific age, i.e., those aged between 15 years 3 months and 16 years 2 months at the time of the assessment with at least 6 years of formal schooling. Most countries took computer-based assessments in PISA 2018.

PISA aims to assess key knowledge and skills that are deemed essential for students to become active and contributing members of the society. It has three main subject areas of reading, mathematics, and science. In each round of PISA, there is a focal subject domain. The main subject area in 2000 was reading, and again in 2009 and 2018. Mathematics was the focal subject area in 2003 and

2012 (the next one scheduled in 2022) while science was in focus in 2006 and 2015. There is also a special theme adopted in a particular year. In PISA 2015, this additional innovative domain was collaborative problem solving, and in PISA 2018 it was global competence which was included for the first time. The main subject domain is tested in more detail than the other two domains each year. The entire PISA testing lasts a total of two hours. In the case of PISA 2018, for example, one hour was allocated for the main subject (reading) and another hour was designated for one or two other domains of mathematics, science, or global competence.

Another main feature of PISA that attracts a great deal of attention from social science researchers is its data produced by a set of questionnaires. Over the years, PISA questionnaires have become a golden standard for advancing innovative methodology in the measurement of education-related psychological constructs. While special questionnaire modules are employed in some years (e.g., Reading for School Questionnaire in 2009, Cross-Curricular Competence Questionnaire in 2000), Student and School Questionnaires are included in all rounds of PISA. The Student Questionnaire contains the constructs related to students' learning motivation, attitudes, beliefs, and behavioral dispositions. The focal subject area is often given priority in a way that many questionnaire items are developed in the context of learning that subject area. Development of the questionnaires takes a couple of years, involving national and international meetings and consultations with technical and questionnaire expert groups and research communities (see Sjøberg, 2020 for further description of the external consultation process).

Selection of the Motivational Constructs for this Review

Our review includes the motivation and closely related constructs that were measured in the Student Questionnaires across all previous PISA cycles. The approach that we took in this process is to include only the scaled constructs that underwent the scaling procedures and construct validation and have been made into the scaled-level variables. Once the scaled variables were derived per construct, each student was assigned scale scores. The scale scores are included in the publicly available PISA international datasets that are downloadable from the OECD website (https://www.oecd.org/pisa/data/).

An important aspect of the PISA questionnaires' international data production is to develop comparable measures. Cross-country validation of the derived variables (such as motivation) is of particular importance because the questionnaire data are often employed for country comparisons. There are two main statistical procedures implemented for cross-country validation of the derived variables in PISA (OECD, 2017, Chapter 16). The first is to obtain a sufficient level of internal consistency, measured by Cronbach's alpha coefficient for each country. The other is to conduct the invariance tests of item and person parameters across countries. Its purpose is to analyze the extent to which the measurement of the latent constructs is consistent across participating countries. Thus, the scaled constructs were examined for cross-country validation across participating countries and were deemed to demonstrate a sufficient level of cross-country comparability (see more technical aspects of the scaling procedure in Adams & Wu, 2003; OECD PISA technical report, 2005, 2009, 2012, 2014, 2017, 2019).

Overview of the Motivational and Related Constructs in PISA 2000 to 2018

The scaled constructs from the PISA Student Questionnaires (2000 to 2018), selected for this review, are presented in Appendix A (i.e., scale labels, scale constructs, assessment year, and whether the constructs are about subject-specific domains). Table 1 is a summary version of Appendix A, presenting just the scaled constructs, domain specificity, and assessment year. We have included not only constructs that are traditionally seen as the 'mainstream' motivational constructs (e.g., instrumental motivation) but also constructs that are seen as being closely related to motivation (e.g., self-efficacy) or often considered to be an important aspect of one's motivation (e.g., joy). Our review revealed that PISA has generated 56 motivation and closely related constructs, which can be divided into several major domains of (a) motivation, (b) self-efficacy and self-concept, (c) interest, (d) attitude, (e) emotion/joy, (f) emotion/anxiety, (g) value, (h) aspiration for career, and (i) aspiration for education. To gain an overall sense of the trends in the selection of motivation and related constructs included in PISA over time, we have also tallied the scaled constructs against the assessment year and eight construct domains (see Table 2). Total frequency is presented along with the

number of times that the domain constructs were measured in the context of subject-specific areas [i.e., see the number after a slash (/)].

As can be seen in Table 2, the motivation domain itself was more frequently represented than the other constructs. Motivation was included 17 times across seven cycles of PISA, followed by self-efficacy and self-concept, which were included 13 times during the same period. The remaining constructs were included less frequently: interest (6 times), attitude (5 times), emotion/joy (5 times), and emotion/anxiety (5 times). Overall, it does not appear to be the case that certain domains have gained more attention in recent years, as both motivation and self-efficacy/self-concept were employed throughout the 2000 to 2018 period. There was one year, 2009 (reading-focus assessment) when both motivation and self-efficacy/self-concept were excluded, and instead, attitudes towards school and enjoyment of reading were included. However, compared to the 2009 assessment, more construct domains were covered in 2018, i.e., the next cycle of the reading-focus assessment.

Table 1. Scaled constructs of motivation and related concepts in PISA 2000, 2003, 2006, 2009, 2012, 2015, and 2018

Domain & Scaled Construct	General	Reading	Mathematics	Science	Assessment Year				
Motivation									
Work mastery	√				2018				
Resilience	√				2018				
Mastery goal orientation	√				2018				
Instrumental motivation	√		√	√	2015	2012	2006	2003	2000
Achievement motivation	√				2015				
Attributions to Failure			√		2012				
Intentions			√		2012				
Work ethic			√		2012				
Perseverance & Effort	√				2012	2000			
Future-oriented motivation				√	2006				
Value (General & Personal)				√	2006				
Self-perception									
Self-concept	√	√	√	√	2018	2012	2006	2003	2000
Self-efficacy	√		√	√	2015	2012	2006	2003	2000

Domain & Scaled Construct	General	Reading	Mathe-matics	Science	Assessment Year				
Interest									
Interest		√	√	√	2015	2012	2006	2003	2000
Attitude									
Attitude towards school: Activities	√				2018	2012			
Attitude towards school: Outcomes	√				2012	2009	2003		
Positive emotion									
Joy/Like		√		√	2018	2015	2009	2006	2000
Negative emotion									
General fear of failure	√				2018				
Anxiety	√		√		2015	2012	2003		
Achievement press	√				2000				
Aspiration									
Aspiration: Career	√				2018	2015	2006	2003	
Aspiration: Education	√				2003				

Table 2. Number of times that scaled constructs of motivation and related concepts are Included in PISA 2000, 2003, 2006, 2009, 2012, 2015, and 2018

	2000	2003	2006	2009	2012	2015	2018	Total	Subject Specific	Reading	Math	Science
1. Motivation	2/0	1/1	4/4	0	5/4	2/1	3/0	17	10		√	√
2. Self-Perception	4/2	2/2	2/2	0	2/2	1/1	2/2	13	11	√	√	√
3. Interest	2/2	1/1	1/1	0	1/1	1/1	0	6	6	√	√	√
4. Attitude	0	1/0	0	1/0	2/0	0	1/0	5	0			
5. Positive emotion/Joy	1/1	0	1/1	1/1	0	1/1	1/1	5	5	√		√
6. Negative emotion/Anxiety	1/0	1/1	0	0	1/1	1/0	1/0	5	2		√	
7. Aspiration: Career	0	1/0	1/0	0	0	1/0	1/0	4	0			
8. Aspiration: Education	0	1/0	0	0	0	0	0	1	0			

Note. Number after a slash (/) is the number of times that the domain constructs are being measured in the context of subject-specific areas (i.e., reading, mathematics, or science).

Motivational Constructs and Domain-Specificity

The four columns on the right-hand side of Table 2 present summary information about how often the scale-derived constructs were measured in the context of subject-specific areas. We found that about 60% (10 out of 17) of the motivational constructs were measured in the context of the subject areas, and 85% (11 out of 13) of self-efficacy and self-concept were measured in the context of the subject areas across reading, mathematics, and science. The only time that self-efficacy or self-concept was measured in a general way was in 2000. Self-efficacy was measured in 2000 by three items ("I am certain I can understand the most difficult material presented in texts"; "I am confident I can do an excellent job on assignments and tests"; and "I am certain I can master the skills being taught"; see Adams & Wu, 2003, p. 241). Academic self-concept was measured by three items: "I learn things quickly in most school subjects"; "I'm good at most school subjects"; and "I do well in tests in most school subjects" (see Adams & Wu, 2003, p. 239). However, general self-efficacy and self-concept were not measured after 2000. Instead, they have been contextualized in learning about the specific subject areas from the 2003 assessment onwards. It is also interesting that while self-efficacy/self-concept have been measured across all three domains of reading, mathematics, and science, motivation was measured with respect to mathematics and science but not reading. Further, in the most recent 2018 (reading-focus year), the following three motivational constructs were adopted: work mastery (WORKMAST), resilience (RESILIENCE), and mastery goal orientation (MASTGOAL), all of which were measured in students' approaches to learning in general and not situated within a specific domain.

Interest and joy have been measured in the context of the subject areas, 100% of the time. However, interest was not measured in the recent two cycles of the reading-focus years (2009 and 2018) although it was included in the first reading-focus year of 2000. Instead of interest, joy was adopted as the scaled constructs in 2009 and 2018. On the other hand, in the context of learning mathematics (in 2003 and 2012) joy was not, but interest was, measured. In the context of learning science (in 2006 and 2015), both joy and interest were included in both years. Thus, joy was measured only in the context of reading and science but not in the context of mathematics.

Anxiety was present in most years, except for 2006 (science-year) and 2009 (reading-year). Anxiety was measured in the context of learning mathematics in both 2003 and 2012, while general anxiety was measured in 2000 as 'achievement press' (feeling pressured to achievement) and in more recent years of 2015 (test anxiety) and 2018 ('general fear of failure'). Therefore, anxiety was linked to learning mathematics, but general-learning anxiety was preferred in the more recent years of science (2015) and reading (2018). Attitude towards school, included in 2003, 2009, 2012, and 2018, was consistently measured with respect to students' attitude towards school in general and has not been measured in the context of learning specific subject areas. In two years of science (2006 and 2015), this construct was omitted.

Students' aspiration was measured in terms of career in 2003, 2006, 2015, and 2018 (by the same open-ended question: "What kind of job do you expect to have when you are about 30 years old?"), or in terms of educational level in 2003. Student response about career aspiration is converted to occupational status following ISCO codes. In the 2006 data, it was also converted to whether students are likely to have science-related career at age 30 (variable labelled as SRC_S). While the career-related aspiration was measured four times, the educational aspiration was measured only once in 2003, by asking "Which of the following do you expect to complete?" with five response categories to choose from: (a) middle or junior high school, (b) high school, (c) vocational/technical certificate, (d) Associate's degree, and (e) Bachelor's degree or higher.

In summary, we found that:

- There was no historical shift towards favoring particular constructs or construct domains.
- Motivation and self-efficacy/self-concept have been the most frequently employed throughout 2000 to 2018.
- Motivation, self-efficacy/self-concept, interest, joy, and anxiety were mostly measured in the context of specific subject domains.
- There appears to be a 'natural' pairing between the constructs and the subject areas. Motivation was for mathematics and science; joy was for reading and science; interest was mainly for mathematics and science; anxiety was about mathematics but not about reading or science.
- In the latest year of assessment, there appears to be a trend towards moving the constructs into a general learning context, especially in the domains of motivation and anxiety.

Major Educational Psychology Theories and PISA's Scaled Constructs

In this section, we evaluate PISA's motivational and related constructs in terms of the major motivation theories. According to Forbes (2011, see Table 2), there have been nearly 80 different theories proposed to explain human motivation. We focus on motivational theories in the field of educational psychology, and on the theories whereby the PISA's motivational concepts are included. We briefly introduce each of the theories and then consider the relevance and usefulness of PISA's scaled-constructs in the context of the theories.

Self-determination Theory (SDT)

SDT (Deci, 1980; for an update see Ryan & Deci, 2017) is, arguably, the most extensively studied motivation theory in the field of educational psychology today. This theory distinguishes between two motivational types, intrinsic and extrinsic motivation. Intrinsic motivation is said to occur when students find the activity pleasurable in and of itself and thus engage themselves in the activity for internal satisfaction and enjoyment. Extrinsic motivation, on the other hand, refers to when students perform the activity exclusively to satisfy an external demand (e.g., getting a good grade). The theory postulates that 'internalization' can occur, in-between extrinsic and intrinsic motivation, whereby motivation is monitored, regulated, and reflected upon people's other goals and desires in life. The internalization process can happen in three ways: (a) introjected regulation (i.e., task engagement not because it is personally important but because of external reason such as not to disappoint parents or teacher); (b) identified regulation (i.e., when engagement with the task is aligned with the person's other pursuits and desires in life such as getting a good grade to secure a university entrance); and finally, (c) integrated regulation (i.e., task engagement is fully assimilated to self-perception and his/her other belief system such as linking a good grade in school and better life in future). According to the SDT, intrinsic motivation and more internalized forms of motivation are desired for voluntary participation in learning, learning approaches with curiosity, creativity, and enthusiasm, and achievement (Ryan & Deci, 2017). Part of SDT is the 'Basic Needs Theory' (BNT). It assumes that humans have innate needs for competence, autonomy, and relatedness to others. Thus, perception of autonomy, and also the "quality" of motivation, increases from conditions that

satisfy external regulation through to integrated regulation. Thus, it postulates that a type of motivation to engage in an activity depends on the degree to which these needs are seen as being satisfied.

In PISA, the term, instrumental motivation (which is similar to extrinsic motivation) is used, and the associated scales (INSTSCIE or INSTMOT) were included in 2000, 2003, 2006, 2012, and 2015. However, intrinsic motivation was not adopted in PISA surveys. Instead, a related construct 'interest' was assessed in 2000, 2003, 2006, 2012, and 2015, which can be considered as a proxy for intrinsic motivation. Nevertheless, different motivational types postulated in SDT, especially the internalization ones, which can be considered as the process of moving from extrinsic to intrinsic motivation, have not been fully employed in PISA. Another motivational construct referred to as achievement motivation (MOTIVAT) was measured in 2015. The MOTIVAT was constructed based on the items: (a) "I want top <grades> in most or all of my courses"; (b) "I want to be able to select from among the best opportunities available when I graduate."; (c) "I want to be the best, whatever I do'; (d) 'I see myself as an ambitious plan"; (e) "I want to be one of the best students in my class". Therefore, it is not clear how this achievement motivation is theoretically identifiable within the spectrum of a range of SDT motivational constructs. In motivation research, the Achievement Motivation subscale of Jackson's (1974) Personality Research Form is often used as the indicator of achievement motivation, which is measured with items such as "I enjoy difficult work" and "I often set goals that are difficult to reach" (Elliot & Church, 1997). As such, there is a nuance of intrinsic motivation and mastery goal orientation in this scale, while the PISA's Achievement Motivation scale is slightly tilted toward extrinsic motivation. Thus, reflecting on the spectrum of motivational constructs within SDT, it appears that the utility of SDT as described above cannot be addressed or fully tested with the PISA data.

Attribution to Failure Theory (AFT)

AFT was proposed by Heider (1958) and elaborated further by Weiner (1986; 2019). It is concerned with how individuals interpret the failure or success of an event and how this relates to their thinking, motivation, and behavior. In the case of failure, the designation of responsibility for the outcome is an important aspect of explanation since it indicates whether the individual is in control of the cause of

failure. The theory postulates four main 'causes' of attribution: ability, effort, task difficulty, and luck (McClure et al., 2011). These attributions are influenced by three causal dimensions: locus (internal or external), stability (lasting or temporary), and controllability (controllable or uncontrollable). For example, effort is considered to be internal, unstable, and controllable while ability is considered internal, stable, and uncontrollable (Fishman & Husman, 2017). These causal dimensions are linked to either adaptive or maladaptive forms of attribution. Internal and controllable attribution, which is considered adaptive attribution (Cleary & Zimmerman, 2001), would lessen negative affect, and support and sustain motivation to persist. For example, if a failure is attributed to the lack of effort that is perceived as controllable, the person feels responsible. A likely consequence is a feeling of guilt, which can be resolved by an improved performance. Further, the perception of being in control of one's own learning is associated with choosing more challenging academic tasks, exerting more effort, and persisting longer at more difficult problems. On the other hand, if a failure is attributed to the lack of ability which is perceived as uncontrollable, the person may not be fully responsible although s/he maynot avoid feeling shamed, followed by decline in performance.

In the PISA 2012 cycle, the questionnaire items relevant to AFT were employed and made into the scale labeled as "Attributions to failure in mathematics" (FAILMAT). The scale was based on six items: (a) "I'm not very good at solving mathematics problems"; (b) "My teacher did not explain the concepts well this week"; (c) "This week I made bad guesses on the quiz"; (d) "Sometimes the course material is hard"; (e) "The teacher did not get students interested in the material"; and (f) "Sometimes I am just unlucky", along with the item stem that reads as: "Each week, your mathematics teacher gives a short quiz. Recently you have done badly on these quizzes. Today you are trying to figure out why." Thus, the attributional causes included in this scale were ability, teacher, luck, and task difficulty in the context of learning mathematics, while effort was not addressed. In PISA 2012, a scale measuring perseverance (PERSEV) was included which can be used as a proxy for students' reporting of their effort level. However, limitations of using the PERSEV scale together with FAILMAT, to test AFR are clear: the perseverance scale was not measured in the context of mathematics, nor contextualized to failure attribution (i.e., asking students to think about 'why' they have done badly). Also, it would be more ideal if each of the attribution causes was measured at the scale-level and incorporated scenarios for reading or science, not just mathematics.

Expectancy Value Theory (EVT)

According to EVT (Vroom, 1964; see Eccles & Wigfield, 2002; Wigfield & Eccles, 2020), two factors can determine motivation for a particular behavior: (a) expectancy (i.e., how likely it is that a wanted outcome will be achieved through the action); and (b) value (i.e., how much the individual values the desired outcome). These two factors are in a multiplicative relationship – i.e., motivation = expectancy x value – implying that motivation is high when both are high but becomes small when one of them is small. Expectancy itself is supposed to have two subcomponents that are related multiplicatively as well. One of these, also labeled expectancy, refers to a person's belief about her/his personal capability to perform a given activity at a required level. The second subcomponent (labeled instrumentality) relates to a person's belief about the probabilistic association between a performed activity and the desired outcome. Eccles and Wigfield (2002) pointed out that both expectancy and value are influenced by task-specific beliefs (e.g., task difficulty) and person's self-schema and goals. Further, the theory distinguishes four components of task value: (a) intrinsic value (enjoyment); (b) attainment value (personal importance of doing well in a given task); (c) utility value (the degree of fit between the task and goal attainment); and (d) relative cost (considering required effort, lost alternative opportunities, and potential negative affect).

Value was measured in the context of learning science in 2006 (see Tables 1 and 2, and Appendix A). Two scaled variables were derived: "General value of science" (GENSCIE) and "Personal value of science" (PERSCIE). The former was measured by the five items: (a) "Advances in <broad science and technology> usually improve people's living conditions", (b) "<Broad science> is important for helping us to understand the natural world", (c) "Advances in <broad science and technology> usually help improve the economy", (d) "<Broad science> is valuable to society", and (e) "Advances in <broad science and technology> usually bring social benefits". The latter "Personal value of science" (PERSCIE) was measured by the five items: (a) "Some concepts in <broad science> help me see how I relate to other people", (b) "I will use <broad science> in many ways when I am an adult", (c) "<Broad science> is very relevant to me", (d) "I find that <broad science> helps me to understand the things around me", and (e) "When I leave school there will be many opportunities for me to use <broad science>". Between these two value constructs, the latter is closer to the concept of value in the EVT. However, it is

limited to personal utility value and attainment value and does not include intrinsic value or relative cost value. The main variables in the EVT, i.e., expectancy and instrumentality, are not included in the same year when the personal value scale was included, and thus, PISA data have a limited capability to test the EVT.

Achievement Goal Orientation Theory (AGOT)

Another motivation theory that has been extensively adopted in educational psychology is known as the Achievement Goal Orientation Theory (Ames & Archer, 1987; Elliot & Church, 1997). The theory was originally developed by identifying two distinct orientations toward achievement: a performance goal focusing on the demonstration of competence to others, and a mastery goal focusing on the development of competence and task mastery (Ames & Archer, 1987). Elliot and his colleagues (e.g., Elliot & Church, 1997) expanded this to incorporate performance/mastery and approach/avoidance and proposed three types of achievement orientation: (a) mastery goal, (b) performance-approach goal (directed toward the attainment of favorable judgements of competence), and (c) performance-avoidance goal (focusing on avoiding unfavorable judgements of competence). Mastery goals can facilitate intrinsic motivation, achievement motivation, and high expectancies. Performance-approach goals can enhance performance when it is combined with achievement motivation and high expectancies. Finally, performance-avoidance goals are detrimental to intrinsic motivation as they are associated with fear of failure, low engagement, and low competence expectations (Elliot & Church, 1997).

It appears that the AGOT was considered in the 2018 assessment, which is evident in the derived variables of Mastery (WORKMAST) and Mastery Goal Orientation (MASTGOAL). However, both derived variables are about mastery goals and the other two components of the AGOT – performance-approach and performance-avoidance goals – were omitted in PISA 2018. Other motivational constructs that are often employed to explain the the three achievement goal orientation constructs include fear of failure (which was included in 2018), competence expectancy (for which the self-concept in reading scale may be used as a proxy), and intrinsic motivation (for which the joy of reading scale may be adopted). Another motivational construct that is often linked to the achievement goal orientation is achievement motivation, which was available in the achievement

motivation scale (MOTIVAT) in 2015 but not in 2018. Unfortunately, when these proxy scales were used within the 2018 data, there was a mismatch in domain specificity. Both Work Mastery (WORKMAST) and Mastery Goal Orientation (MASTGOAL) are about students' learning orientation in general while the self-concept of reading (SCREADCOMP) and joy of reading (JOYREAD) scales are about students' attitudes towards reading. As such, to test the utility of the AGOT using the PISA 2018 data, either the main constructs are omitted or somewhat distant proxies may need to be employed, which can be seen as a limitation to the integrity of the theory.

Effort-Discounting Theory (EDT)

In PISA, students' effort and perseverance were deemed relevant and important enough to measure cross-nationally in its first cycle (i.e., via the scale labeled as EFFPER in 2000). Afterwards, they were not included until 2012, in the form ofthe perseverance scale (PERSEV). In 2012 another similar construct, work ethics in mathematics (MATWKETH) was also included. Achievement motivation researchers consider ability and effort to be the critical factors of student achievement (Weiner, 1994). Highly motivated individuals are expected to engage in the activity with great effort and prolonged persistence when trying to successfully carry out the given activity.

Effort is, undoubtedly, embedded in most motivational theories. For example, within the Attribution to Failure Theory (AFT), ability and effort are the main components of how students attribute their failure, which can have differential effects on self-efficacy and achievement (Schunk, 1983). Within the Achievement Goal Orientation Theory (AGOT), a performance goal orientation is hypothesized to lead to a preference for easy tasks and withdrawal of effort in the face of challenging tasks (Elliot & Church, 1997). When effort is accompanied by achievement motivation, individuals will overcome fear of failure and challenge themselves to take on difficult tasks (Elliot & Church, 1997). Within the Expectancy Value Theory (EVT; Eccles & Wigfield, 2002; Wigfield & Eccles, 2020), an individual's belief about their own personal ability to perform a given activity (i.e., expectancy) is often a result of their perceptions about their performance level and effort. In other words, an individual would evaluate whether she/he can reach a desired level given their ability and effort expenditure (Wigfield & Eccles, 2020).

Several researchers proposed the Effort-Discounting Theory (EDT) (see Bonnelle et al., 2015). This theory places effort at the center of one's judgement leading to motivation. Its basic assumption is that effort requirement can diminish subjective utility of a given task, and lower motivation. In other words, subjective task utility is evaluated given effort requirements and expected gains which are determined by the value and probability of the rewarding outcome. The expected cost is also considered in one's evaluation of effort requirements, time demands, and the cost of missing out on other activities. Although effort is considered one of the most important variables in motivation research because of its connection to achievement motivation, attribution to failure, self-efficacy, and achievement, it has not been regularly employed in PISA (other than the question about the effort level when taking the PISA tests).

Self-Efficacy Theory (SFT)

As shown in Tables 1 and 2, self-efficacy was included in 2000, 2003, 2006, 2012, and 2015 except for the reading-focus years of 2009 and 2018. SFT as articulated by Bandura (1977, 1997) postulates that motivation to act intentionally is influenced by an individual's belief about her/his ability to act competently in a specific task situation. A person will undertake a particular task if she/he believes that the task will be performed successfully. It is assumed that a strong feeling of self-efficacy would promote achievement and broader personal well-being. Individuals with high self-efficacy are more likely to make efforts to complete a task, exert persistence to achieve desired outcomes, and view challenges as tasks to be mastered rather than personal threats. On the other hand, individuals with low self-efficacy may exhibit reduced effort and persistence, lowered performance, and higher levels of stress and depression. According to Bandura (1997), four factors can affect self-efficacy: (a) personal experience of success, known as 'mastery experience', (b) modeling, known as 'vicarious experience', which is seeing someone succeeding and taking it as a model for success, (c) social persuasion, which is direct encouragement or discouragement from another person, and (d) physiological experience, which suggests that self-efficacy can be altered when individuals experience physical signs of distress such as pain, fatigue, fear, nausea. In PISA, although self-efficacy has been regularly employed, except for the reading-focus years of 2009 and 2018, it fell short of exploring the

theoretical accounts of possible sources that might show individual and group differences in self-efficacy and their potential links to achievement.

Self-Concept Theory (SCT)

SCT has a long history in psychology that refers to a collection of beliefs about oneself. These beliefs are based on self-assessment that aims to identify aspects that are important for a person's identity. Academic self-concept (see Hattie, 1992; Marsh,1990) refers to the beliefs about oneself with respect to the abilities and skills needed for performance in educational settings. One's self-concept also reflects his/her self-comparison to his or her immediate peers (i.e., frames of reference). The 'big-fish-little-pond effect (BFLPE)' is part of the frame of reference model. The BFLPE is said to occur when able students have lower academic self-concepts because they compare themselves to more able peers in their immediate environment. On the other hand, equally able students can have higher academic self-concepts if they compare themselves with less able peers. The BFLPE has implications for ability grouping practice, selective schools, and schools in disadvantaged/advantaged neighborhoods.

Another model within the Self-Concept research is known as the Internal/External Frame of Reference Model (the I/E model; see Marsh, 1990). It suggests that students regard themselves based on self-evaluation of their own achievement levels in a subject area in relation to their achievements in other areas. Although a student may do well in both reading and mathematics, his/her self-concept in reading and mathematics may differ depending on their self-perception/self-identity. Self-concept researchers (e.g., Marsh,1990) have raised the importance of understanding students' self-concept, not just in academic domains, but also in social self-concept (including perceptions about peers, families, and significant others), emotional self-concept, and physical self-concept (influenced by physical ability and physical appearance).

Similar to self-efficacy, self-concept has been a popular construct in PISA, measured in 2000, 2003, 2006, 2012, and 2018, across all three domains of reading, mathematics, and science. However, like the self-efficacy theory, PISA has not explored the possible postulated sources that can influence self-concept within the contexts of theoretical explanations proposed by the BFLPE or the I/E model. Non-academic domains of self-concept (such as social, emotional, and

physical) may also be a relevant direction to understand adolescents' achievement and wellbeing in future PISA cycles.

Possible-Selves theory (PST)

A theory that can be seen as a sub-branch of self-concept is known as 'Possible-Selves Theory' (PST; Markus & Nurius, 1986). The concept of possible selves was introduced to complement the existing conceptions of self, which tend to be influenced by one's past experiences. On the other hand, PST focuses on the future-self, which refers to how individuals think about their potential and future accomplishment. Individuals' ideas of possible selves – what they might become, what they would like to become, and what they are afraid of becoming – go through the cognitive and affective components of evaluation, hope, and aspiration. Possible selves can serve as an evaluative context for the current views of the self, act as future-selves to be approached or avoided, and thus, become the motivation to direct future behavior to obtain goals in life. In this way PST provides conceptual links between self-concept (of past, present and future) and motivation to work towards desired outcomes. In PISA, the concept of possible selves can be traced in the derived variables of 'student's expected occupational status' (BSMJ) included in 2003, 2006, 2015, and 2018, and 'student's expected educational level (SISCED) included only in 2003. The concept of possible selves can be explored in relation to self-concept, achievement motivation, instrumental motivation, and enjoyment by using the PISA data.

Interest Development Theory (IDT)

Interest has been measured in all mathematics (2003 and 2012) and science (2006 and 2015) focal years in PISA. However, it has been measured by one derived variable either in the context of mathematics or science in each year, and interest was not measured in the reading-focus year after 2000. While it is acknowledged that there are individual differences in global academic interest as a cognitive-behavioral-psychological general tendency towards a broad range of academic areas (e.g., Lent et al., 1994; Lee & Durksen, 2021), the interest research tended to focus on how subject-specific interest is developed in the areas such as

mathematics (e.g., Ganley & Lubienski, 2016; Mitchell, 1993), science (e.g., Krapp & Prenzel, 2011) and reading (e.g., Hidi, 2001; Kirby et al., 2011).

Further, the contemporary interest research pays attention to the process of interest development and how it can be supported in the classroom environment. The interest development model that has been extensively studied in the field is the four-stage interest development, proposed by Hidi and Renninger (2006). In this model, interest is seen as a predisposition to re-engage in a particular activity over time, which involves both affective and motivational functioning. While the theory recognizes the influences of individual experiences, temperament, and genetic predisposition, it also recognizes the importance of the learner's environment and person-environment interactions as the conexts of one's interest development. The postulated four stages are known as: (a) triggered situational (interest that is 'triggered by the environment), (b) maintained situational (triggered interest is maintained), (c) emerging individual (the maintained interest becomes personal interest), and (d) well-developed individual interest (interest becoming part of the person's characteristics with little to no input required from the environment). Throughout this process, either new or existing interest is (re)initiated when the environment provides the 'triggers' to learners, and repeated engagement can occur. In the final stage of well-developed individual interest, one can further develop their interest without support from situational triggers by the environment. To formally test this four-stage interest development theory, longitudinal data are required to document the developmental process, which is beyond the scope of the current form of the PISA project.

Attitude Towards School (ATS)

Attitude is often understood to consist of the A-B-C (affective-behavioral-cognitive) components (e.g., Lee, 2021). Students' attitude towards school (ATS) consists of the beliefs and expectations (cognitive) and feelings (affective) that may lead to a particular behavior (behavior). In PISA, two types of attitudes towards school have been included: Attitude towards School in Learning Outcomes (ATSCHL) in 2003, 2009, and 2012; and Attitude towards School in learning Activities (ATTLNACT) in 2012 and 2018. The ATSCHL was measured by four items: (a) "School has done little to prepare me for adult life when I leave school", (b) "School has been a waste of time", (c) "School has helped give me confidence to make decisions", and

(d) "School has taught me things which could be useful in a job". Thus, this scale aims to capture what students think about the outcome of the overall schooling. The ATTLNACT scale was measured by the following four items: (a) "Trying hard at school will help me get a good job" (b) "Trying hard at school will help me get into a good <college>" (c) "I enjoy receiving good <grades>", and (d) "Trying hard at school is important". Thus, this scale appears to tap into extrinsic motivation, utility value, and enjoyment through feeling of competency.

Research on student attitude seems to have formed its line of theorizing while moving away from the traditional motivation theories introduced in the earlier section of this chapter. For example, McKenna et al. (1995) identified three factors that affect attitudes towards reading: (a) beliefs about the desired outcomes of reading (e.g., pleasurable, useful, frustrating, or boring), (b) beliefs about the expectations of others that are related to the strength of one's motivation to conform to those expectations, and (c) the outcomes of specific academic and recreational incidents of reading. With respect to mathematics, Wilkins and Ma (2003) reported that attitude toward mathematics and beliefs about the social importance of mathematics may influence students' overall attitude towards school. In PISA, most of the derived variables of motivation, self-efficacy/self-concept, interest, and enjoyment have been measured in the context of learning specific academic domains. Therefore, the association between domain-specific motivation and students' overall attitudes toward school can be examined in PISA data.

Academic Emotions Theory (AET)

Motivation theories, seen as self-regulation, attribution, achievement motivation, self-efficacy, and expectancy-value theories, recognize the role of emotions in learner motivation and achievement orientation. For learners to be self-determined and self-regulated in learning, positive emotions should serve as both antecedents and outcomes. Fear of failure, perception of the locus of control, and external attributions to failure can engender negative emotions and deplete achievement motivation. Thus, AE researchers such as Pekrun and his associates (e.g., Pekrun et al., 2002) consider academic emotions (e.g., enjoyment, hope, pride, relief, surprise, anger, shame, hopelessness, boredom, and anxiety) as critical aspects of learners' motivation. It is believed that emotions can help learners to

sustain attention and physiological energy towards completion of the required action. Thus, learners' emotions are significantly associated with self-regulation, motivation, adaptive learning strategies, use of cognitive resources, and academic achievement (Pekrun et al., 2002).

The AET recognizes four clusters of emotions: (a) enjoyment, hope, and pride (induced by positive events), (b) relief (induced by stop of negative events), (c) anxiety, shame, and hopelessness (induced by the lack of subjective control), and (d) anger and boredom (induced by negative events but implying a higher level of personal control). The theory further postulates that academic emotions are situated as being task- (enjoyment vs. boredom) and self-related (joy about success vs. disappointment) or as socially driven motives (admiration vs. contempt). In an attempt to integrate theoretical accounts of expectancy-value and attribution theories, Pekrun et al. (2002) proposed a control-value theory of academic emotions. According to this theory, both perceived control and value are necessary antecedents of learners' emotions. The perceived control is influenced by retrospective causal attributions, state-related control, appraisal of the present situation, and causal expectancies. Causal expectancies are believed to be formed by self-efficacy, situational outcomes, and action-outcome expectations. Together with this control perception, intrinsic and extrinsic values and goal orientations interact for learners to feel a certain emotion towards a task, effort requirement, motivation, and academic performance.

Emotions that have been included in PISA are joy of reading in 2000, 2009, and 2018, joy of science in 2006 and 2015, general fear of failure in 2018, mathematics anxiety in 2003 and 2012, test anxiety in 2015, and achievement press in 2000. Thus, in a nutshell, PISA assesses joy, fear, anxiety, and feeling of stress. While a range of intricate and nuanced emotions have not been included in the PISA measures, joy and anxiety – one positive and one negative emotion – have been regularly employed. Together with other motivational and similar derived constructs in PISA, i.e., self-efficacy, attribution to failure, intrinsic motivation, achievement motivation, mastery goal orientation, intentions to further study, and value, the roles of emotions in learners' motivation and achievement can be examined in the PISA data.

CONCLUSION

In this chapter we reviewed motivational and closely related constructs that were employed in PISA 2000 to 2018. We first identified them and presented an overview of which construct domains have been measured in what assessment years and which subject areas. We then briefly described the major theories of motivation and related constructs and appraised whether PISA data can be used for advancing theoretical work in the field of educational psychology.

As presented in this chapter, while there are plenty of derived scales in PISA that appear to be grounded in motivational theories, PISA data fell short of including a 'whole' set of key constructs to test and further explore the reviewed motivational theories. While motivation theories have been extensively developed in the past few decades, PISA has not sufficiently incorporated the mainstream motivation theories and associated constructs. It is understandable that a single theory cannot be extensively featured in PISA because there are many competing constructs and theories to be covered. However, this trend continues to disappoint motivation researchers. Contemporary theories of motivation place emphasis on the identification of antecedents, possible causes, and mediational paths whereas PISA's utility to advance this line of research appears to be limited. In a way, it is fair to state that motivational theories have been far more developed than what PISA has incorporated as motivational constructs. To advance motivational research using PISA data, the existing motivation constructs should have been more extensively featured. In addition, systematic assessment of the empirical evidence about the relationships between motivation and achievement (e.g., Lee & Stankov, 2018) will also need to be reflected in future PISA questionnaire item development.

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APPENDIX A

Motivation Scaled Constructs and Scale Labels in PISA 2000, 2003, 2006, 2009, 2012, 2015, and 2018

Domain	Scale Label	Scaled Construct	Subject Specific	Year
Motivation	WORKMAST	Work mastery		2018
	RESILIENCE	Resilience		2018
	MASTGOAL	Mastery goal orientation		2018
	INSTSCIE	Instrumental motivation in science	√	2015
	MOTIVAT	Achievement motivation		2015
	FAILMAT	Attributions to failure in mathematics	√	2012
	INSTMOT	Instrumental motivation for mathematics	√	2012
	MATINTFC	Mathematics intentions	√	2012
	MATWKETH	Mathematics work ethic	√	2012
	PERSEV	Perseverance		2012
	INSTSCIE	Instrumental motivation in science	√	2006
	SCIEFUT	Future-oriented science motivation	√	2006
	GENSCIE	General value of science	√	2006
	PERSCIE	Personal value of science	√	2006
	INSTMOT	Instrumental motivation in mathematics	√	2003
	EFFPER	Effort and perseverance		2000
	INSTMOT	Instrumental motivation		2000
Self-Perception	SCREADCOMP	Self-concept of reading: Perception of competence	√	2018
	SCREADDIFF	Self-concept of reading: Perception of difficulty	√	2018
	SCIEEFF	Science self-efficacy	√	2015
	MATHEFF	Mathematics self-efficacy	√	2012
	SCMAT	Mathematics self-concept	√	2012
	SCIEEFF	Science self-efficacy	√	2006
	SCSCIE	Science self-concept	√	2006
	MATHEFF	Mathematics self-efficacy	√	2003
	SCMAT	Mathematics self-concept	√	2003
	SELFEF	Self-efficacy		2000
	MATCON	Mathematics self-concept	√	2000
	SCACAD	Self-concept (academic)		2000
	SCVERB	Reading self-concept (verbal)	√	2000

Domain	Scale Label	Scaled Construct	Subject Specific	Year
Interest	INTBRSCI	Interest in broad science topics	√	2015
	INTMAT	Mathematics Interest	√	2012
	INTSCIE	General interest in learning science	√	2006
	INTMAT	Interest in mathematics	√	2003
	INTMAT	Interest in mathematics	√	2000
	INTREA	Interest in reading	√	2000
Attitude	ATTLNACT	Attitude towards school: Learning activities		2018
	ATSCHL	Attitude towards School: Learning outcomes		2012
	ATTLNACT	Attitude towards School: Learning activities		2012
	ATSCHL	Attitude towards school		2009
	ATSCHL	Attitudes towards school		2003
Positive emotion	JOYREAD	Joy/Like reading	√	2018
	JOYSCIE	Enjoyment of science	√	2015
	JOYREAD	Joy/Like reading	√	2009
	JOYSCIE	Enjoyment of science	√	2006
	JOYREAD	Enjoyment of reading	√	2000
Negative emotion	GFOFAIL	General fear of failure		2018
	ANXTEST	Personality: Test anxiety		2015
	ANXMAT	Mathematics anxiety	√	2012
	ANXMAT	Mathematics anxiety	√	2003
	ACHPRESS	Achievement press		2000
Aspiration: Expected career	BSMJ	Student's expected occupational status (SEI)		2018
	BSMJ	Student's expected occupational status (SEI)		2015
	BSMJ	Occupational status self (SEI)		2006
	BSMJ	ISCO code student		2003
Aspiration: Education	SISCED	Expected educational level of student (ISCED)		2003

MOTIVATION IN SCIENCE AND MATHEMATICS EDUCATION: A PERSON ORIENTATED APPROACH

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Abstract. One largely unanswered question is why students are only marginally intrinsically motivated in STEM classes (Science, Technology, Engineering and Mathematics). According to the PISA study, this is especially true for Austrian students. This article investigates the quality and quantity of learning motivation in mathematics and science lessons at secondary level. A cluster analyses was used, with the aim of identifying non-linear relationships. Additionally, motivationally relevant conditions are elicited and related to types of learning motivation. The theoretical basis is self-determination theory (SDT), which, in addition to intrinsic motivation, consists of four forms of extrinsic motivation that differ in the degree of self-determination. Self-determined forms of motivation are determined by the satisfaction of basic psychological needs in a classroom, namely the needs for autonomy, competence and social relatedness. In a cross-sectional analysis, with 1308 students from STEM classes, four clusters distinguishable in quantity and quality could be identified: a cluster with poor motivational quality, one with overall low motivation, a highly self-determined cluster, and a mixed cluster with high motivation in all dimensions. Analyses of variance demonstrated that the clusters differed systematically in their perception of the learning environment and in relevant process and outcome variables, namely subject related self-concept and anxiety, fit of requirements as well as achievement. In addition, it was shown that female students are disproportionately found in the low motivation cluster and boys in the high controlled and autonomous motivation cluster.

Keywords: self-determination theory, basic psychological needs, STEM education, cluster analyses.

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INTRODUCTION

One important goal of educational policy in many countries is furthering STEM education (Science, Technology, Engineering and Mathematics). This aim is motivated by the fact that a comprehensive scientific literacy is relevant to participation in society, including for those who do not aspire to a career in science (Eurydice, 2011; Gräber et al., 2002; McDonald, 2016). Moreover, the demands of the labor market emphasize the importance of STEM education. In Austria a shortage of skilled workers is already noticeable, and the number will increase considerably in the coming years (Müller et al., 2011). Although career opportunities and salaries in science and engineering occupations are quite good, the demand for technical or science education remains still modest. It could be assumed that adolescents do not personally value STEM subjects nor do they observe the great job opportunities assured by a STEM education. Additionally, empirical studies show substantial gender differences in the motivation for learning science and mathematics, which are related to women's low selection of STEM education and modest participation in STEM careers (Mézes et al., 2012; OECD, 2007). International assessment studies show that Austrian students still enjoy science at grade four, but at age 15 their interest decreases. This is a widespread problem in most so-called developed countries (Renninger & Hidi, 2011). In addition, Austrian students perceive science education as less important than do students of most other OECD countries (OECD, 2007; Oberwimmer et al., 2018; Schwantner et al., 2013). Although gender gaps in science achievement have decreased during recent years, girls continue to report lower subject-related and instrumental interest as well as motivation in science than boys (Bundesministerium für Bildung, Wissenschaft und Forschung, 2021; Meece et al., 2006; OECD 2007). International studies also show this and were also able to establish that self-concept-related characteristics are more important than professional competence in career choice (e.g. Wang et al., 2013). Because subject-related interest is one of the most important motivators of career and academic choice (Wang & Degol, 2017), it is a central task of educational research and educational psychology to explore the conditions and processes of the development of interest and intrinsic motivation, as well as the related outcomes.

In the last three decades, research has shown that cognitive and non-cognitive outcomes can be promoted by interdisciplinary and constructivist

approaches, such as situated and problem-oriented learning, life-world relevance, and by building communities of practice or active and self-directed learning, e.g., in laboratory instruction (Hernandez et al., 2014; Thibaut et al., 2018). In this context, programmatic contributions particularly emphasize the importance of sense-making abilities, attitudes, and motivation (McDonald, 2016).

On the one hand, this paper investigates the conditions and manifestations of the quality and quantity of motivation in STEM classes of secondary school students in Austria. Self-Determination Theory (SDT; Ryan & Deci, 2017) is used as a theoretical basis, which is an organismic and dialectical theory conceptualizing the quality of interaction between learning environment and experience as the basis of the development of identity, meaning, well-being, and quality of motivation. The theory distinguishes not only intrinsic and extrinsic motivation, but five motivational regulation styles that differ in the degree of self-determination. The Basic Psychological Need Satisfaction (BPNS) according to autonomy, competence, and relatedness, plays an essential role for the development of self-determined forms of motivation (Vansteenkiste et al., 2004). On the other hand, relevant emotional process variables and outcomes (subject related self-concept and anxiety, fit of requirements, and achievement) are examined and related to motivation.

Most SDT-based studies have examined the relationship between motivation, basic needs, and educational outcomes using linear correlations. Recently, however, it has been widely pointed out that such an approach overlays possible mixed motivations at the person level (Vansteenkiste et al., 2009), and thus motivation types are not identified. In this paper, therefore, a type-analytic approach is used (for the justification see chapter 4.4).

THEORY

Motivational Regulation

Self-determination theory (SDT) is used as the theoretical basis of the present study. STD allows motivation to be differentiated in quantitative and qualitative terms (Ryan & Deci, 2017, 2020).

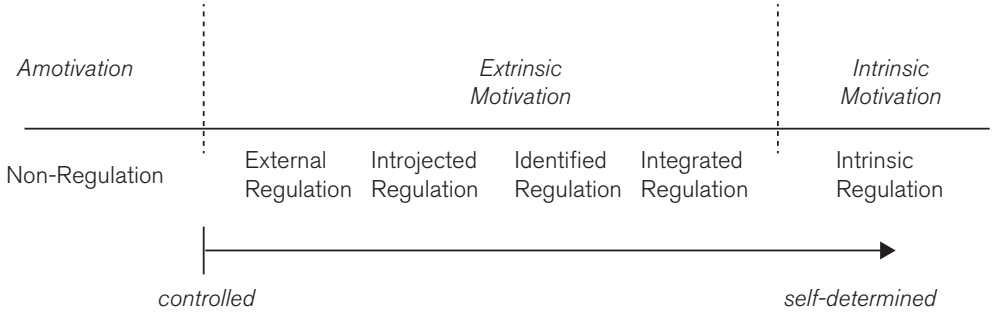

Figure 1. Continuum of self-determination (based on Deci & Ryan, 2002)

On the so-called continuum of self-determination, we can distinguish between amotivated behavior, four regulatory styles of extrinsic motivation, and intrinsic motivation (see Figure 1): According to SDT, *a motivation* is not a motivated behavior in a strict sense, as it is described as non-intentional behavior (Ryan & Deci, 2017). Thus, this regulatory style is located outside the continuum.

External regulation is based on external contingencies, such as achieving rewards or avoiding negative consequences of actions. External regulation corresponds to the 'classical definition' of extrinsic motivation (Ryan & Deci, 2020).

Introjected regulation refers to self-esteem contingencies, such as performing a learning action 'to prove something to oneself' (approach) or because it would be embarrassing not to perform a certain action (avoidance) (Bieg et al., 2020).

Identified regulation focuses on the personal relevance of an action. This is the case, for example, when a learner regulates his or her behavior based on an identification with long-term goals of actions (which are localized outside the action), such as graduating from school.

Integrated regulation is the regulation style of extrinsic motivation that is based most on self-determination. It is defined by identification with subjectively significant values in a field of action. This form of regulation occurs when identifications have been evaluated within the person´s self and harmonized with personal values, goals as well as needs, and thusly forming a congruent element of one's own identity. For example, a student performs "... not inherently rewarding tasks" (Howard et al., 2017) at school and, additionally, attributes high personal relevance – in terms of self-congruence – to the specific actions. Analyses could show that this regulation style – especially in educational settings – is empirically difficult to distinguish from identified or intrinsic motivation (Howard et al., 2017;

Vasconcellos et al., 2020). Therefore, this style of regulation is not surveyed in the present study.

Finally, *intrinsic regulation* represents the prototype of self-determined action and is "wholly volitional, as representative of and emanating from one's sense of self" (Deci & Ryan, 1994). It is associated, for example, with pleasure and inquisitiveness.

In research based on SDT, identified and intrinsic regulation are also summarized as autonomous and external regulation, and introjected regulation as controlled motivation (Vansteenkiste et al., 2009).

Basic Psychological Need Theory

In accordance with SDT, self-determined forms of motivation (intrinsic and identified) are promoted through the basic psychological needs satisfaction (BPNS) of autonomy, competence, and social relatedness. This is also evident in school (Niemiec & Ryan, 2009a; Ryan & Deci, 2017). For example, if students have some leeway for decision-making and can act in a manner congruent with their interests (autonomy), or operate in a learning environment that is perceived as structured, their autonomous forms of motivation are higher. Furthermore, when students have the feeling that they are competent and are developing (competence), or perceive themselves as related to a class community or have a good rapport with the teacher (social relatedness), autonomous forms of motivation (intrinsic and identified regulation) are additionally promoted.

BPNS serves as intrapsychic feedback about whether our actions and interactions in and with the environment are coherent – in terms of self-congruence. Needs are essential for guiding human action and, when satisfied, are associated with feelings of self-determination (Gottfried et al., 2001) and psychological well-being (Ryan & Deci, 2017).

REVIEW

Evidence suggests that BPNS in schooling can explain the quality and quantity of motivational regulation (Ryan & Deci, 2017; Vansteenkiste et al., 2004; Vansteenkiste et al., 2020). BPNS can predict autonomous forms of motivation

in school better than controlled forms of motivation. Moreover, previous research shows that intrinsic motivation, in particular, declines over time in schooling, especially in secondary school (e.g. Gillet et al., 2012; Wigfield et al., 2007). This is mainly related to the fact that instruction is perceived as too controlling which does not sufficiently address adolescents' increasing need for autonomy (Gottfried et al., 2001; Lepper et al., 2005; Murayama et al., 2013). This is especially true for students' intrinsic motivation in the natural sciences (Gottfried et al., 2009; Mullis et al., 2012; Mullis et al., 2008; Thomas & Müller, 2014). Eccles and colleagues were able to show several decades ago – on the basis of stage-environment-fit theory – that the decline in intrinsic motivation in higher grades can partly be attributed to the growing mismatch between students' increasing need for autonomy and the fewer possibilities of choice and self-management (Eccles et al., 1993).

It has been empirically confirmed, in many cases, that autonomous forms of motivation and the satisfaction of basic psychological needs are associated with better well-being, life satisfaction, positive feelings such as flow or freedom from anxiety, or a higher professional self-concept (Burton et al., 2006; Gillet et al., 2012; Marsh et al., 2005). BPNS and autonomous forms of motivation are additionally associated with persistence in educational settings (Vallerand et al., 1997) and with higher achievement as well as deep cognitive processing (Niemiec & Ryan, 2009b; Vansteenkiste et al., 2004). Autonomous forms of motivation are particularly promoted when the level of challenge is in accordance with the students' skills and they are neither over-challenged nor under-challenged.

Moreover, one of the biggest challenges in the education system seems to be to reduce gender differences in STEM education, especially in mathematics (Schwantner et al., 2013). In contrast, previous research on participation in science laboratories indicated no or only small gender differences in intrinsic motivation (Thomas & Müller, 2014).

A Person Orientated Approach

Studies conducted on the basis of SDT have shown that, especially in formal educational settings, students are not only intrinsically or extrinsically motivated, but can also be "mixed-motivated" in a subject (Hayenga & Corpus, 2010; Ratelle et al., 2007; Vansteenkiste et al., 2009; Wang & Biddle, 2001; Wormington et al., 2012; Zason Chian & John Wang, 2008). If only linear relationships between

motivational styles and possible conditions and outcomes are investigated, non-linear relationships may remain hidden. Consequently, in addition to linear correlations, it makes sense to use cluster analyses in order to outline motivation types and to relate these to conditions and effects (Lin et al., 2003; Wormington et al., 2012).

SDT-based studies in education could show that distinguishable clusters can be found in quality and quantity (Hayenga & Corpus, 2010; Lin et al., 2003; Ratelle et al., 2007; Vansteenkiste et al., 2009). Mostly, clusters with high quantity are found in controlled and autonomous motivation, clusters with overall low motivation in all regulation styles (low motivation), or clusters with low quality of motivation (low autonomous and high controlled motivation). In addition, most studies also identify a type that exhibits a high quality of motivation (high autonomous and low controlled motivation), although this is not always the case (Ratelle et al., 2007). Depending on the setting and the study group, variations of these four types can also be found.

It is worth mentioning in this context that some studies include all regulatory styles separately as a basis for clustering (Langan et al., 2016; Ratelle et al., 2007), whereas other studies use two cumulative scales (autonomous and controlled motivation) (Vansteenkiste et al., 2009). If only two scales, autonomous and controlled motivation, are used, it is not possible to verify whether there are differentiations in the cluster analysis between all regulatory styles. In particular, clustering has so far neglected to consider the two aspects of approach and avoidance in cluster analysis for introjected regulation.

With respect to outcomes in educational settings, it has been shown that clusters with high motivational quality (autonomous motivation), for example, exhibit less school anxiety and higher school satisfaction and perform better (Ratelle et al., 2007). Clusters with less adaptive forms of motivation (high controlled regulation) tend to show less favorable educational outcomes. However, there is also some empirical evidence that combined motivation (high quality motivation and less adaptive forms of motivation) can predict academic achievement (Lin et al., 2003). This is especially the case when students are highly autonomously motivated and at the same time have medium controlled motivation.

METHODOLOGY

Design and Research Questions

It is assumed that BPNS are associated with self-determined forms of motivational regulation. In addition, it can be hypothesized that self-determined motivated learning is associated with pronounced subject-related self-concept, lower anxiety, fit of demands (neither over- nor under-challenge), and higher achievement.

- On the basis of previous studies, we assume that empirically distinguishable types of motivation can be found. These should differ in the expression (quantity) and the degree of self-determination or control (quality) in the regulation styles (see e.g. Vansteenkiste et al., 2009).
- Based on recent conceptualizations of introjected regulation, it is expected that the approach aspect corresponds with autonomous forms of motivation and the avoidance aspect with controlled forms of motivation. This differentiation has hardly been considered within the SDT research of clustering.
- Students who can be assigned to a type with high scores in the autonomous forms of motivational regulation (intrinsic and identified) will differ significantly from the more controlled motivated or overall low motivated types in BPNS, perception of the relevance of the content as well as the in the perceived enthusiasm of the teacher (Vansteenkiste et al., 2009).
- In addition, it can be assumed that person types with pronounced autonomous motivation show higher subject self-concept, less anxiety and overload, as well as better performance than clusters with higher controlled regulation styles or overall low motivational strength (Thomas & Müller, 2014).
- Moreover, in terms of an exploratory analysis, we investigate whether mixed types (e.g., high autonomous and at the same time high controlled regulation) differ in outcomes from other types. Here, the question of whether autonomous motivation 'immunizes' against possible negative outcomes of controlled motivation is of particular interest.
- Based on previous research on STEM education and learning motivation, we can expect that female students are significantly more likely to be found in clusters with lower levels in the autonomous forms of motivation or with overall low motivational strength.

Sample

The study examined 1,321 Austrian secondary school students from STEM classes. It was possible to use 1,308 records, excluding 13 cases due to missing data (list wise). Students were on average 14.23 (SD = 1.80) years old and 47.8% were female. Most students were attending a middle school (secondary lower level at the time of the survey (52.9%). 34.3% went to a high school, 10.6% to a polytechnic school, and 2.2% to a vocational school.

The questionnaires were handed out by a teacher at the beginning of a regular class period and, after being completed by the students, were sealed in an envelope that was returned to the researchers. The students were informed that the data would be treated anonymously and that the survey was voluntary and that they could stop filling the questionnaire in at any time.

Instruments

For the survey of motivational regulation styles, validated and abbreviated scales were used (Thomas & Müller, 2016). They are essentially based on the two most widely used scales for measuring regulation styles in SDT research (Levesque et al., 2006; Ryan & Connell, 1989; Vallerand et al., 1992). In addition, both aspects of introjected regulation (approach and avoidance) were surveyed separately because it could be assumed that this distinction would be profitable for cluster analyses and that the effects of the two scales for the outcomes could be different.

> *Example items:* External: *... because I just have to learn it.* Introjected (avoidance): *... because I would feel guilty if I did little.* Introjected (approach): *... because I want my teacher to think I am a good student.* Identified regulation: *... because I can use the things I learn here later.* Intrinsic motivation: *... because I enjoy it.*

To answer the questions, all the items had a 5-point Likert scale from 1 (do not agree at all) to 5 (agree very strongly). The reliabilities were satisfactory, with values between .69 and .93 (see Table 1). In addition, the so-called simplex structure could be replicated, which assumes that regulation styles that are close together on the continuum of self-determination correlate higher than those that are further apart (see Table 3 in the Appendix 1).

Example items for BPNS scale: Autonomy: *My teacher is responsive to suggestions and ideas from us students.* Competence: *When my teacher explains something to me, I understand it much better afterwards.* Social relatedness (peers): *I have a good relationship with my classmates.*

Social relatedness (student-teacher): *I have a good relationship with my teacher.*

The Cronbach's Alpha values between .77 and .82 are acceptable. In addition to BPNS, the relevance of the content and the perceived enthusiasm of the teacher were also assessed. Items from the scales of Prenzel (1996) were used for this purpose. Subject-related self-concept and subject-related anxiety each assessed with five proven items from the PISA study (Mang et al., 2018). The alpha values here are also very satisfactory at .81 and .85. In addition, we formulated self-constructed items on over- or underchallenge as well as on school satisfaction. Finally, the questionnaire also asked about the grade in the last semester.

Statistical Analysis

Cluster Analysis

The aim of cluster analysis is to partition objects (here students) into disjoint clusters, so that differences within one cluster are as small as possible and differences between clusters are as large as possible. We performed k-means cluster analyses to identify groupings of students with similar motivational profiles. Because of the exploratory character of the cluster analysis it is appropriate to replicate cluster solutions in order to validate the results (Breckenridge, 2000). For cross validation of the results, we divided the original sample by chance into two subsamples of equal size and applied k-means clustering to each subsample. The agreement of the cluster solutions was assessed with Cohen's kappa coefficient (Asendorpf, 2006).

As all types of motivational regulation were assessed with the same metric (i.e. a five-point Likert scale), it was not necessary to apply z-standardization. By using the original scale, we present results that are good to interpret, because the presentation with z-scores can easily lead to misinterpretation of the results. This is due to the negative values which may create the impression that some students are not motivated at all, although they are only deviating from the other students of the sample.

In addition to Pearson correlations, single-factor analyses of variance (ANOVA: procedure Scheffé) were also conducted to test for differences between the motivation clusters in terms of motivational conditions, process and outcome variables.

RESULTS

Descriptive Statistics

Overall, the autonomous forms of motivational regulation (identified and intrinsic) are somewhat more pronounced than the controlled forms of motivation (external and introjected) (see Table 1). With regard to the perceived learning environment, the basic needs for competence and relatedness (within the peer group) as well as teacher enthusiasm are rated relatively high. With regard to the process and outcome variables, the relatively high standard deviations for the aspects of over- and underchallenge are particularly striking, indicating that the level of demands is not suitable for some students in STEM classes. For the general school satisfaction (M = 2.51, SD = 1.08) a value clearly below the middle of the scale is found (see Table 1).

Table 1. Descriptive statistics and reliabilities of all variables

Variables	M	SD	A	items	N
Motivational Regulation					
External regulation	2.61	.94	.69	4	1308
Introjected regulation (avoidance)	2.72	1.23	.71	2	1308
Introjected regulation (approach)	2.87	1.17	.71	2	1308
Identified regulation	3.52	1.13	.86	4	1308
Intrinsic motivation	3.06	1.16	.93	5	1308
Perceived learning environment					
Support of autonomy	3.53	0.97	.82	4	1308
Support of competence	3.76	0.92	.82	4	1308
Social relatedness (s – t)[1]	3.55	0.95	.77	2	1308
Social relatedness (s – s)[2]	4.18	0.95	.78	2	1308

Variables	M	SD	A	items	N
Relevance of contents	3.28	0.94	.85	2	1308
Teacher enthusiasm	3.89	0.96	.66	2	1308
Process variables and outcomes					
Subject related self-concept	2.73	.77	.85	5	1308
Subject related anxiety	1.89	.75	.81	5	1308
Overchallenge	2.50	1.23	-	1	1308
Underchallenge	2.72	1.24	-	1	1308
General school satisfaction	2.51	1.08	-	1	1308
Achievement (grades of the last semester)	3.85	1.13	-	-	1308

Note. Scales: 1 = disagree, 5 = agree; achievement: 5 = very good, 1 = insufficient. 1: social relatedness (students – teachers) 2: social relatedness (students – students).

Cluster Analyses

Four motivational clusters, which can be interpreted in terms of content and distinguished in terms of level and quality, could be extracted (see figure 2). Those withstood cross validation with Cohen's kappa: Type 1: poor motivational quality (31,7%); Type 2: low motivation (22,4%); Type 3: high motivational quality (22,7%); Type 4: high quantity of motivation (23,2%).

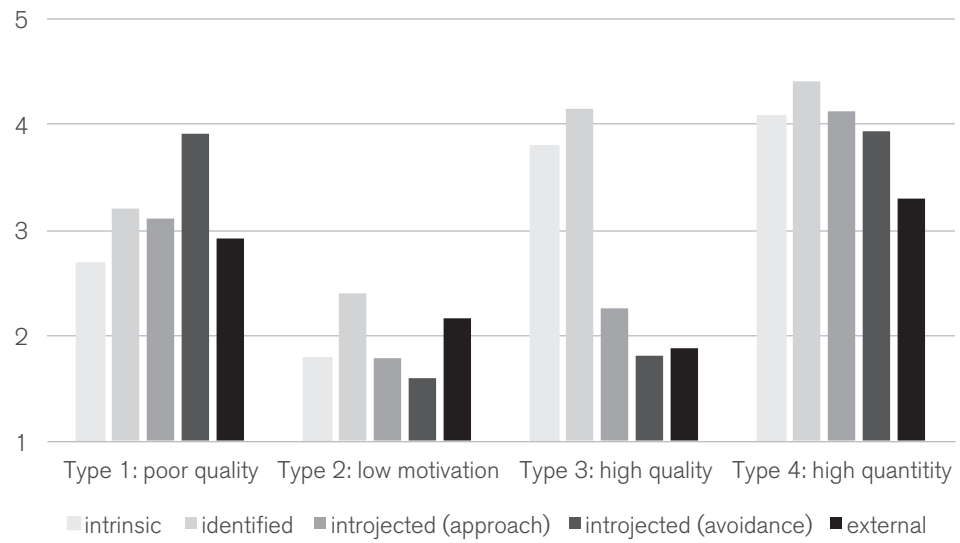

Figure 2. Types of motivational regulation

The first motivational cluster can be labeled 'poor quality' because the two autonomous forms of motivation (intrinsic and identified) and two of the controlled forms of motivation (introjected: approach and external) are relatively low. However, this cluster is also characterized by a pronounced introjected regulation (in the aspect of avoidance), which suggests a suboptimal motivational quality and is associated with shame and bad conscience, 31.7% of the students in STEM classes belong to this cluster.

The second cluster ("low motivation") shows low values in all motivation dimensions. 22.4% of the students belong to this type, which means that they have poor motivational prerequisites for favorable cognitive outcomes, such as identification with the subjects from the STEM area.

Cluster three ("high motivational quality") is highly intrinsically motivated as well as highly identified regulated when learning a STEM subject. In addition, this type is characterized by low controlled forms of regulation (introjected and externally regulated). 22.7% of the students can be assigned to this cluster.

Finally, the fourth cluster can be described as being high in all motivational regulations. In addition, it exhibits the highest levels in the two autonomous forms of motivation (intrinsic and identified). Students in this group perceive learning in STEM classes as joyful and identify with the goals of the class. At the same time, however, they also drive their learning actions by 'internal pressure' and by the motive to 'increase their self-worth'. Behavior is also shaped by anticipated rewards and avoidance of negative consequences.

Clusters and Learning Environment

Analyses of variance showed that the clusters differed significantly in many motivational conditions, processes, and outcomes. First, we will discuss the differences and similarities between the clusters that relate to the perception of the learning environment (s. Tab. 2): Type 3 (high quality) and Type 4 (high quality & quantity) do not differ in BPNS, content relevance, or perceived teacher enthusisam. Both clusters rate the learning environment positively, as evidenced by high mean scores ranging from 3.82 to 4.30.

Except for peer-related social relatedness, the first two clusters (poor quality and low motivation) differ significantly from clusters 3 (high quality) and 4 (high quality & quantity) in all aspects of the learning environment. The lowest scores

on perceived environmental conditions (except for social relatedness in the peer group) are found for Type two, which is also the least motivated overall. Above all, the relatively low support of autonomy and social relatedness to the teacher as well as the low perceived relevance of contents in Cluster 3 differ significantly from the assessments of the other clusters.

Table 2. Means and standard divisions of the motivational types

	Type 1 "poor quality"	Type 2 "low motivation"	Type 3 "high quality"	Type 4 "high quantity"	total
Learning environment:					
Support of autonomy	3.32_{a} (0.86)	2.93_{b} (1.02)	3.88_{c} (0.87)	4.01_{c} (0.72)	3.53 (0.97)
Support of competence	3.74_{a} (0.78)	3.26_{b} (1.08)	4.19_{c} (0.75)	4.30_{c} (0.75)	3.76 (0.92)
Social relatedness (s – t)[1]	3.38_{a} (0.90)	2.86_{b} (1.18)	3.93_{c} (0.92)	4.09_{c} (0.89)	3.55 (0.95)
Social relatedness (s – s)[2]	4.02_{a} (0.99)	4.14_{ab} (1.08)	4.19_{bc} (0.75)	4.30_{c} (0.75)	4.18 (0.92)
Relevance of contents	3.06_{a} (0.78)	2.40_{b} (0.75)	3.82_{c} (0.76)	3.92_{c} (0.68)	3.28 (0.94)
Teachers' enthusiasm	3.74_{a} (0.91)	3.50_{b} (1.12)	4.21_{c} (0.80)	4.16_{c} (0.82)	3.89 (0.96)
Process variables and Outcomes:					
Subject-related self-concept	2.51_{a} (0.70)	2.28_{b} (0.75)	3.12_{c} (0.61)	3.09_{c} (0.62)	2.73 (0.77)
Subject-related anxiety	2.10_{a} (0.73)	1.88_{b} (0.76)	1.48_{c} (0.54)	1.99_{ab} (0.77)	1.89 (0.75)
Overextension	2.84_{a} (1.15)	2.70_{a} (1.30)	1.86_{c} (1.0)	2.46_{ab} (1.21)	2.50 (1.23)
Underchallenge	2.48_{a} (1.15)	2.26_{b} (1.17)	2.95_{c} (1.15)	3.23_{d} (1.25)	2.72 (1.23)
General school satisfaction	2.36_{a} (1.02)	2.10_{b} (1.01)	2.66_{c} (1.00)	2.95_{d} (0.97)	2.51 (1.08)
Achievement[3]	3.72_{a} (1.09)	3.72_{a} (1.14)	4.15_{c} (1.01)	3.87_{ab} (1.01)	3.85 (1.13)
Percentage of female students	50.6%	58.5%	45.3%	35.7%	47.8%

Note. Scales: 1 = disagree, 5 = agree. For each dependent variable, means with different subscripts indicate significant differences at $p < 0.01$ using an ANOVA (procedure Scheffé). 1: social relatedness (students – teachers) 2: social relatedness (students – students) 3: 5=very good, 1=insufficient.

Clusters and Process and Outcome Variables

With regard to the process variables and outcomes, there are clearly accentuated differences between the clusters. Clusters 1 and 2, with the less favorable motivational profiles, differ slightly. Cluster 2 is less anxious in STEM classes and shows slightly lower school satisfaction than cluster 1. Interestingly, cluster four (high quantity motivation) shows almost the same scores in subject-related anxiety, perceived overload, and grade performance as both clusters 1 and 2. Clusters 3 and 4 show significantly higher scores in subject-related self-concept

and school satisfaction. In addition, some students in cluster 3 and especially in cluster 4 show a tendency to be underchallenged in STEM classes.

As expected, there is a systematic and significant distribution of male and female students across the four clusters. Girls are overrepresented in cluster 2 (low motivation) (58.5%) and underrepresented in both clusters 3 and 4 (45.3% and 35.7%, respectively).

Finally, the findings are summarized and discussed in terms of theoretical and practical implications.

SUMMERY AND DISCUSSION

One goal of the paper was to identify motivational types that differ empirically in the quality and quantity of motivational regulation in STEM instruction. A second intention of the analysis was to find differences between the types in terms of perceived learning environment, process and outcome variables, and gender.

Clusters

A cluster analysis revealed four types that can be interpreted in terms of content and that differ substantially in the quality and quantity of motivational regulation. A profile with poor quality in motivation, a type with overall low motivation in all regulation styles, a cluster with high autonomous and low controlled motivation (high quantity) as well as a mixed cluster with high autonomous and controlled motivation emerged. The clusters found in this sample are similar to, but not exactly congruent with, previous findings (e.g. Liu et al., 2009; Müller & Louw, 2004; Vansteenkiste et al., 2009). Similarly, Vansteenkiste and colleagues (2009) found a cluster with high quality (here Type 3), one with low motivation (here Type 2), and one with high quantity in all regulatory styles (here Type 4). The type with low quality motivation (highly controlled and low autonomously regulated) identified by the Belgian colleagues is not found in the same form in our cluster analysis. Type 1, which we have labeled poor quality, has a high value only in the dimension avoidance of introjected regulation, but not in external regulation (s. also Ratelle et al., 2007). This could be due to the fact that Vansteenkiste and colleagues did not include individual regulation styles in the cluster analysis, but

used the two cumulative dimensions “autonomous” and “controlled”. This conceals possible differences within controlled regulation. In addition, as in Vansteenkiste's case, most cluster analyses did not differentiate between approach and avoidance in introjected regulation. The findings of this study were able to show that this differentiation is worthwhile because, as with Type 1, clear differences can be found between the two subdimensions of introjected regulation. Type 1 is primarily avoidance motivated.

Moreover, consistent with the literature, the study showed that individuals can be rather mixed-motivated (Ratelle et al., 2007; Vansteenkiste et al., 2009; Wang & Biddle, 2001). For example, students in STEM classes may perceive themselves as highly autonomous and highly controlled (see Type 4). This is especially the case in formal educational settings, as, for example, intrinsically motivated students may also be performance motivated and want to receive good grades or praise (external regulation).

Cluster and Learning Environment

It was assumed that the perceived learning environment in STEM classes (BPNS, teacher enthusiasm and relevance of contents) is predictive of the quality and quantity of motivational types. Consistent with expectations, it was shown that both Types 3 and 4, which had high quality and overall high quantity of motivation, respectively, also rated the learning environment positively. This is true for all learning environment variables used, except for social relatedness in the peer group. Apparently, social relatedness in the class community is relatively independent of motivational regulation. This is plausible because students may perceive themselves as socially well integrated into a school class but may not exhibit strong motivation or may be purely externally regulated. In particular, Type 2, with low motivation in all dimensions, reported low content relevance and moderate social relatedness with the teacher in STEM classes. As many as 22% of the students belong to this type.

Cluster and Process and Outcome Variables

Substantial differences between the clusters were found for the process and outcome variables. In particular, this demonstrated the added value of cluster

analyses compared with correlative study designs. Thus, students with high autonomous motivation (intrinsic and identified, Types 3 and 4) have higher scores in subject-related self-concept than both Types 1 and 2, which have low motivational quality and quantity, respectively.

The cluster analysis demonstrates particularly well that the quantity of autonomous forms of motivation is not only relevant for the processes of learning and the outcomes. The level of controlled forms of motivation is also significant: Clusters 3 and 4 have almost the same values in intrinsic and identified regulation, but differ significantly in controlled motivation. Type 4 students (high controlled motivation) are significantly more anxious, more overchallenged, and report lower achievement than Type 3 students, who show significantly lower controlled motivation scores (up to 2 standard deviations!). Furthermore, Type 4 shows slightly lower achievement than Type 3; Types 1 and 2 have the same achievement as Type 4. Thus, the results of Lin and colleagues (2003) could not be replicated. They showed that a combination of intrinsic and extrinsic motivation leads to higher performance than for purely intrinsically motivated individuals.

Of all the clusters, Type 4 is the most satisfied with school. This could be related to the fact that this type is autonomously motivated on the one hand and controlled on the other. This may mean that the fit with the school system, which traditionally works with extrinsic motivators such as grades or the threat of punishment, is better than with Type 3, which is largely autonomously motivated.

Finally, we explored the hypothesis of whether students are distributed differently among the clusters according to gender. Female learners are overrepresented in Type 2 (low motivation) in STEM classes (58.5%) and underrepresented in Types 3 (high quality) and Type 4 (high quantity). This was to be expected, as it is also known from international comparative studies that female students show less interest and enthusiasm for learning in STEM (Schwantner, 2009).

In summary, it can be stated that motivation clusters can present a differentiated picture of students' motivation and that there is an analytical added value compared to linear correlation studies. Depending on the quality and quantity of the clusters, different effects result, especially for variables of the learning process and the outcome. Furthermore, the differentiation in the introjected regulation according to approach and avoidance was profitable insofar as Type 1 (low quality) is predominantly avoidance motivated. An undifferentiated

reporting of introjected motivation or the use of combined scales (autonomous and controlled motivation) would have masked this effect.

LIMITATIONS

The study also has some limitations. It cannot be ruled out that the students answered in a socially desirable way, since the survey was conducted at school and the teachers were present in the classroom when the questionnaires were filled out. In addition, the sample was not assembled systematically. Thus, the subjects that were involved in the respective STEM lessons were not equally distributed. It can also be assumed that due to the voluntary nature of participation, dedicated teachers with their classes are represented to a greater extent in the sample.

It must also be considered that the data are self-reported by the students. Especially when school performance is reported in grades, it cannot be ruled out that the data could be incorrect. In addition, it is known that grade performance is not an optimal measure of students' academic performance.

No longitudinal data are available, so the findings can hardly be interpreted causally. Moreover, only longitudinal studies can demonstrate the stability of types, which future studies should do.

PRACTICAL IMPLEMENTATIONS

This study was also able to show that the satisfaction of basic needs, the relevance of the content, and the perceived enthusiasm of the teacher are related to autonomous forms of motivation. This has practical implications: In particular, the relevance of STEM content is highly correlated with intrinsic motivation ($r = .71$; $p < .001$). For Types 1 (poor motivation) and Type 2 (low motivation), to which more than 54% of the students belong, the largely missing meaningfulness of the content seems to be responsible for the unfavorable motivational situation. Subjective relevance arises less from informing students about the social significance and good career prospects in STEM. Rather, relevance arises from experiencing efficacy (BPSN for competence), something about learning in the lab or participating in an environmental project. In addition, significant others as

models (social relatedness to the teacher) are as relevant to the development of motivation and interest as the feeling of being able to act autonomously.

In summary, based on this study and many findings that used SDT as a theoretical basis, it can be stated that the satisfaction of basic psychological needs is essential in STEM instruction to enable meaning, interest, and identification. This includes authentic problem- and lifeworld-based learning settings (e.g. Barrable & Arvanitis, 2019; Thibaut et al., 2018). Otherwise, it will hardly be possible to inspire young people for STEM.

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Table 3. Pearson correlations for all variables (N = 1308)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Learning motivation:																
1. External regulation	-															
2. Introjected reg. (avoidance)	.47**	-														
3. Introjected reg. (approach)	.46**	.55**	-													
4. Identified regulation	.17**	.25**	.29**	-												
5. Intrinsic motivation	.08**	.26**	.37**	.48**	-											
Learning environment:																
6. Support of autonomy	.03	.16**	.23**	.31**	.53**	-		.								
7. Support of competence	.04	.15**	.25**	.36**	.48**	.72**	-									
8. Social relatedness (s –t)	.01	.17**	.26**	.32**	.50**	.66**	.65**	-								
9. Social relatedness (s –s)	-.08**	.00	.05	.12**	.07**	.23**	.22**	.27**	-							
10. Relevance of contents	.07*	.21**	.17**	.57**	.71**	.47**	.49**	.46**	.07*	-						
11. Teachers' enthusiasm	-.05	.08**	.14**	.21**	.36**	.64**	.60**	.54**	.26**	.30**	-					
Process variables and outcomes:																
12. Subject-related self-concept	-.09**	.03	.20**	.31**	.57**	.39**	.38**	.46**	.12**	.48**	.29**	-				
13. Subject-related anxiety	.36**	.25**	-.10**	-.06*	-.18**	-.19**	-.21**	-.25**	-.14**	-.16**	-.20**	-.58**	-			
14. Overchallenge	.25**	.15**	.04	-.11**	-.24**	-.21**	-.20**	-.27**	-.12**	-.22**	-.17**	-.53**	.59**	-		
15. Underchallenge	.05	.07*	.21**	.20**	.36**	.16**	.16**	.21**	.01	.27**	.05	.40**	-.20**	-.22**	-	
16. General school satisfaction	.02	.20**	.14**	.18**	.30**	.23**	.21**	.30**	.21**	.24**	.23**	.13**	.01	-.06*	.01	-
17. Achievement	-.15**	-.04	.03	.08**	.19**	.23**	.19**	.26**	.09**	.15**	.14**	.53**	-.42**	-.32**	.15**	.05

*= p <.05; **= p <.01

MOTIVATIONAL MATHEMATICS PROFILES OF PRIMARY SCHOOL CHILDREN: HOW DO THEY REALLY FEEL ABOUT MATH?*

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Abstract. Using a person-centred approach and drawing on the expectancy-value theory, namely expectancies of success (i.e., perceived competence) and task values (i.e., intrinsic, utility, cost, and attainment), this chapter investigates different aspects of primary school students' motivation towards mathematics. Data are drawn from an international study on developing mathematics motivation in six European countries in grades three to five. In this chapter, we use data from Serbia, Portugal, and Norway. Three different motivational profiles group the students. Country, grade, and boy/girl differences are further explored, coupled with examining how profiles differ in connection to the enjoyment of mathematics and mathematics identity.

Keywords: motivation, emotion, identity, person-centred approach, primary education.

* *Note*: Co-constructing mathematics motivation in primary education – A longitudinal study in six European countries (MATHMot) has received funding from the Research Council of Norway within FINNUT Programme for Research and Innovation in the Educational Sector (grant number 301033).

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INTRODUCTION

Grasping mathematics is necessary to meet modern life's demands (Ehmke et al., 2020; Freeman et al., 2015; OECD, 2016). At the same time, research demonstrates that students' optimal motivation in a particular domain, such as mathematics, is vital to their positive outcomes in that same field (Dowker et al., 2016; Schöber et al., 2018; Skaalvik et al., 2015; Stankov & Lee, 2017; Wang, 2012; Watt et al., 2012). The latter has contributed to developing students' optimal attitudes towards mathematics to gain further support (Aditomo & Klieme, 2020; Freeman et al., 2015; Radišić et al., 2021).

Conversely, studies investigating students' motivation are largely present across adjacent mathematics education and educational psychology fields. However, these primarily explore the relationship between students' motivation and outcomes in math (e.g., Schöber et al., 2018; Skaalvik et al., 2015; Stankov & Lee, 2017). Indirectly, such studies assume that the relationship between motivation and outcomes is alike for all students. In contrast, a person-centred approach adopts the idea of inherent heterogeneity in a given population (Bergman & Trost, 2006) and thus possibly discovers distinct patterns across a large group of individuals. The person-centred approach may aid in a more profound understanding of diverse learners and, as a result, their needs. Studies of such an approach are on the rise (Berger et al., 2020; Dietrich & Lazarides, 2019; Radišić et al., 2021; Radišić et al., 2023; Raufelder et al., 2022; Watt et al., 2019). However, even when examining student profiles across sites, i.e., countries (Radišić et al., 2023) and targeting lower-grade students, samples involve students from year six and above (e.g., Raufelder et al., 2022), but rarely younger students (Viljaranta et al., 2016).

Grounded in the expectancy-value theory (Eccles & Wigfield, 2020) and relying on the person-centred approach (Bergman & Trost, 2006), this chapter investigates mathematics motivational profiles of students in grades three to five in Norway, Serbia, and Portugal.

Data are used from an international project MATHMot[1] focused on the development of mathematics motivation. We then investigate country, grade and gender differences across the profiles and how students within the profiles might differ concerning their enjoyment of math and math identity.

1 Co-constructing mathematics motivation in primary education – A longitudinal study in six European countries (grant number 301033)

Theoretical Background

Amongst diverse frameworks that shed light on students' motivation, Eccles' expectancy-value theory (EVT) gathers a variety of aspects, all of which affect the decisions students make (Eccles et al., 1983; Eccles & Wigfield, 2020; Wigfield & Eccles, 2020). The EVT builds on the assumption that students' expectancies for success and subjective task values attributed to the task are vital to their choice, performance, and further engagement with the task itself (Wigfield & Eccles, 2020). Within the EVT, expectancies for success are seen as individuals' beliefs about their success in (future) tasks. On the other hand, task values are the qualities of the tasks and their influence on the motivation for doing the tasks (Eccles & Wigfield, 2020; Wigfield & Cambria, 2010). The theory differentiates between four components of task values – intrinsic value, utility value, attainment, and cost.

Intrinsic value conveys the enjoyment one develops from participating in a task or interest in the subject, similar to the notion of intrinsic motivation (Eccles & Wigfield, 2020). Utility value builds on the individual's perception of the task's usefulness in attaining important goals, even if no intrinsic value is attached to the task itself. Thus, utility relates to the more extrinsic reasons for engaging with the task (Wigfield & Eccles, 2020).

Attainment value integrates identity issues and the importance of doing well on the task. It is bounded by the extent to which the task fulfils the person's needs, thus connecting to the activity's importance in the broader spectrum of the individual self-schema (Eccles & Wigfield, 2020). Cost is the last of the four identified dimensions and it integrates all the adverse aspects of engaging with the task (e.g., alternative, more preferred activities, or too much effort). Still, the cost is critical because all choices involve concerns about what one must give up to do a task (Eccles et al., 1983; Eccles & Wigfield, 2020). Despite its importance, the cost dimension has been the least operationalised (Eccles & Wigfield, 2020) and studied value component compared to the other three components (Eccles & Wigfield, 2020; Kosovich et al., 2015; Wigfield & Cambria, 2010).

While studies are somewhat inconsistent on the extent to which expectations of success predict immediate student math outcomes (Marsh et al., 2017; Prast et al., 2018; Wang, 2012; Watt et al., 2012), linking values, intrinsic in particular, to engagement and choices to stay in the field of mathematics, differences between

boys and girls are notable. Studies mostly favour boys when examining expectancy for success (Nagy et al., 2010; Geary et al., 2019). What is important, though, is that from a developmental point of view, starting in primary school, children differentiate between expectancies for success (e.g., competence perceptions) and discriminate between valuing activities (cost included) in connection to these activities (Eccles & Wigfield, 2020).

In addressing the myriad of factors related to students' optimal academic development, coupled with EVT, control-value theory (CVT, Pekrun, 2017) focuses on the idea of achievement emotions. Achievement emotions are an overarching term, gathering a variety of emotions students may experience in connection with learning and achievement activities (Putwain et al., 2018). Within CVT, enjoyment (of math) can be defined as a positive, activity-oriented emotion coupled with the perception of having high control over the activity one is involved. Enjoyment is crucial to self-regulation and motivation, intrinsic motivation in particular and overall engagement in the learning process (King et al., 2015), with a tendency to decrease as the students get older (Boekaerts & Pekrun, 2015).

Recently, studies on achievement emotions and diverse motivational constructs have been backed up by a strand focusing on students' perception of their competence at a skill-based task or activity in a particular domain like mathematics (Darragh, 2016; Radović et al., 2018). Within the context of academic identity, such beliefs can significantly affect student engagement in school activities and later career choices (Wan et al., 2021). Mathematics identity is also important in mathematics education as it can provide a new perspective in clarifying why some students underachieve or disengage from math, despite their ability (Graven & Heyd-Metzuyanim, 2019). Research shows that students can use social feedback from significant others (e.g., parents and teachers) or social comparisons to shape motivational beliefs about their abilities and interests in different academic domains (Wan et al., 2021). On the other hand, math identity could be linked to students' expectancy beliefs when evaluating possible success in particular tasks or activities that are to come (Wigfield et al., 2006).

Current Study

Until now, studies have demonstrated significant links between task values, expectancies of success, student outcomes, and/or relevant career choices

(Marsh et al., 2017; Prast et al., 2018; Wang, 2012; Watt et al., 2012). In addition, academic emotions contribute to understanding students' motivational spectrum and why some students may disengage from the mathematics field (Putwain et al., 2018). Recent studies on mathematics identity further contribute to these insights (Wan et al., 2021). However, most studies focus on relationships between the variables, implicitly disregarding possible differences between the participants involved. Conversely, the person-centred approach considers potential differences between individuals whose outcome measures are used in examining these relationships and/or effects (Bergman & Trost, 2006).

The approach is built on an array of clustering and latent class techniques. Among them, latent profile analysis (LPA) uses continuous indicators to generate solutions with maximally dissimilar groups. It allocates individuals (i.e., students) who are dissimilar to one another across examined indicators (i.e., task values) to different groups and individuals who are similar to the same one. The outcome is homogeneous but mutually exclusive latent groups within a broader heterogeneous population. The number of such groups and their compositions are unknown beforehand (Geiser, 2013; Magidson & Vermunt, 2002). Further analyses allow the groups to be even more described with the help of covariates and predictors examined within the process.

Previous person-centred studies relying on the EVT framework primarily used all task values except cost. There are scarce examples employing them all (e.g., Dietrich & Lazarides, 2019; Raufelder et al., 2022). Both expectancies of success and task values are domain-specific (Dietrich & Lazarides, 2019) or maintain domain-specificity, though the study may observe adjacent fields (e.g., math and science; Berger et al., 2020; Viljaranta et al., 2016). Studies vary in populations examined but lack those focusing on the youngest students (i.e., before grade six; Raufelder et al., 2022; Viljaranta et al., 2016). Across the profiles, attainment value, intrinsic value, and utility value are positively correlated; while cost is negatively linked to these three factors, similar to Peixoto et al. (2022) examination. Cross-country assessments mostly use large-scale international data (e.g., Radišić et al., 2023). The motivational profiles identified include examples of mixed profiles (e.g., high cost, low intrinsic value) and those that consistently show high or low scores on all its examined aspects (Dietrich & Lazarides, 2019; Radišić et al., 2023; Raufelder et al., 2022; Viljaranta et al., 2016).

Against such a background, in this chapter, we examine profiles of students combining expectancies of success (i.e., perceived competence) and all task values (i.e., intrinsic, utility, cost, and attainment). Due to that, we expect both mixed and cohesive profile solutions (Dietrich & Lazarides, 2019; Radišić et al., 2023; Raufelder et al., 2022; Viljaranta et al., 2016).

Then, we examine sex, country and grade differences between the profiles. Given the prevalence of studies favouring boys concerning the expectancy of success (Nagy et al., 2010; Geary et al., 2019), such differences are also expected. We expect the profile solution to be visible across the countries, but distinct country patterns are foreseen (Radišić et al., 2023). With student age, the prevalence of less optimal groups is expected, due to the declining nature of some of the constructs examined, i.e., intrinsic value (Eccles & Wigfield, 2020). Finally, the relationship between the profiles, math identity, and enjoyment of math is observed. We postulate that students with favourable motivational profiles will report higher levels of enjoyment (King et al., 2015) and a stronger math identity (Graven & Heyd-Metzuyanim, 2019; Wan et al., 2021; Wigfield et al., 2006).

METHODS

Participants

The current investigation is part of a broader study focused on developing mathematics motivation in six European countries, the MATHMot project[1]. We use data from the project pilot phase, namely those collected in Serbia, Norway, and Portugal in spring 2021. The present sample gathers 1,115 students (339 from Norway, 339 from Portugal and 437 from Serbia). A more detailed overview is presented in Table 1. All students attended regular primary schools, mainly located in larger urban areas, while all data were collected during regular classroom sessions by trained research assistants. Parents' consent was gathered before the data collection.

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Table 1. Sample overview

Country	Total	Grade 3	Grade 4	Grade 5	% girls
Norway	339	107	108	124	49.6%
Portugal	339	124	117	98	51.0%
Serbia	437	146	169	122	50.9%

Measures and Variables

All survey instruments were administered in paper-and-pencil format. The Expectancy-Value Scale (EVS – Peixoto et al., 2022) was used to assess diverse aspects of students' motivation for mathematics. EVS comprises 28 items anchored on a 4-point Likert scale. The five dimensions of EVS include intrinsic value (e.g., I like doing math), utility (e.g., What I learn in math I can use in daily life), attainment (e.g., Being good in math is very important to me personally), cost (e.g., Doing math problems keeps me away from other things I like), and perceived competence (e.g., Math is easy for me). Measurement invariance was established earlier for the full measure. The fit model was confirmed for the current sample (CFI=0.957, TLI=0.953, RMSEA=0.041, SRMR=0.063), while the reliability across dimensions was maintained (Cronbach's alpha range from 0.7 to 0.87).

AEQ-ES scale (Lichtenfeld et al., 2012) was used to measure enjoyment. The enjoyment subscale consists of nine items focusing on the enjoyment of attending math class, doing homework, and taking math tests. The model fit was satisfactory (CFI=0.984, TLI=0.978, RMSEA=0.080, SRMR=0.041), and scale reliability was confirmed (0.93).

The mathematics identity (MI) scale represents a combination of perceived personal mathematics identity items (e.g., I think I am a math person) and perceived recognised mathematics identity items. For the latter, students inform if they perceive those significant others (i.e., friends, family, math teacher) see them as math persons (e.g., My family thinks of me as a math person). The scale was adapted and further expanded based on the prior work of Vincent-Ruz and Schunn (2018) and Miller and Wang (2019). The MI scale consists of 6 items anchored on a 4-point Likert scale. Again, the model fit was satisfactory (CFI=0.993, TLI=0.989, RMSEA=0.056, SRMR=0.024), and scale reliability was

confirmed (0.80). Demographic variables included country, grade, and biological sex (boys coded 0).

Analytical Approach

A preliminary exploration of the descriptives for each construct preceded the primary analyses. The missing data rate did not exceed 2%.

The first research question focused on investigating students' motivational patterns in mathematics. Given the nature of the constructs involved in the analyses (i.e., continuous measures), latent profile analysis (LPA) was applied in Mplus (Muthén & Muthén, 1998-2017). LPA is a type of latent variable mixture modelling technique that tests the fit and significance of a certain number of latent profiles among individuals within a given dataset (Bergman & Trost, 2006; Collins & Lanza, 2010). In other words, one can observe whether there is a single pattern or a mixture of these (latent profiles) within a distribution. All five dimensions of the EVS (i.e. intrinsic value, utility value, attainment, cost and perceived competence) were used to analyse possible student profiles. Models with two through seven latent classes (k = 2–7) were tested to reveal the number of profiles that emerged from the data. All models were estimated using 1 000 random start value sets with 100 iterations, and the 200 best solutions were retained for the final optimisation stage. The cut-off for the entropy index (Geiser, 2013) and a combination of bootstrapped likelihood ratio test (BLRT), Vuong–Lo–Mendell–Rubin likelihood ratio test (VL-LRT), and the Lo–Mendell–Rubin adjusted LRT test (LMR), as suggested by Asparouhov and Muthén (2012), were considered when choosing the final solution. The final model was again validated, using Geiser's (2013) recommendations on the use of the best log-likelihood value.

Subsequent analyses relate to the second and third research questions. Auxiliary variables sex, country, and grade were treated as covariates. The crosstabs option in SPSS was used to explore country and grade differences. Distinctions between boys and girls were investigated using the R3STEP option in Mplus. Since the BCH[2] method is preferred for dealing with continuous distal outcomes in mixture modelling (Asparouhov & Muthén, 2020; Bolck et al., 2004),

2 BCH method was developed and proposed by Bolck, Croon and Hagnaars (2004). First letters of their last names create the name acronym – BCH.

the technique was used for investigating the relationship between the profiles towards math identity and enjoyment of math.

RESULTS

The results section is divided into three major parts. First, we discuss the basis for establishing student profiles (research question 1). Second, we discuss sex, country and grade differences between the profiles (research question 2). Finally, the relationship between the profiles, math identity, and enjoyment of math is observed (research question 3).

Student Profiles

Table 2 provides an overview of the models tested using the LPA (Geiser, 2013), with a solution range from two to seven groups (k = 2-7). In determining the best model fit, besides statistical parameters, we considered similar previous studies (e.g., Dietrich & Lazarides, 2019; Radišić et al., 2023; Raufelder et al., 2022; Viljaranta et al., 2016), overall theoretical background guiding this investigation (e.g., Eccles & Wigfield, 2020), and the profile characteristics across the solutions and their interpretability.

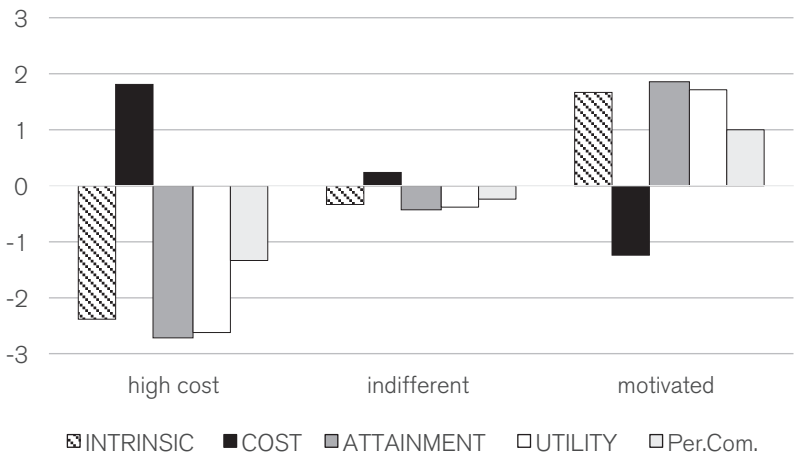
Table 2. Overview of evaluated models

#No.	Log likelihood	#fp	AIC	BIC	SABIC	LMR	BLRT	VL-LRT	Entropy	Smallest class frequency
2	-3759.231	16	7550.462	7630.728	7579.907	/	/	/	0.817	47.2%
3	-3231.826	22	6507.653	6617.999	6548.121	0.0001	0.0000	0.0001	0.882	15.4%
4	-3026.918	28	6109.837	6250.302	6161.367	0.0903	0.0000	0.0868	0.876	5.1%
5	-2882.237	34	5832.475	6003.040	5895.047	0.0011	0.0000	0.0010	0.874	4.8%
6	-2737.173	40	5554.345	5755.009	5627.959	0.0029	0.0000	0.0027	0.838	4.3%
7	-2623.388	46	5338.775	5569.539	5423.431	0.5727	0.0000	0.5687	0.845	1.9%

Note. No = number of profiles; #fp = degrees of freedom; BIC = Bayesian Information criterion; AIC = Akaike's Information Criterion; SABIC = Sample-size Adjusted BIC; LMR = Lo–Mendell–Rubin adjusted likelihood ratio test; BLRT = parametric Bootstrapped Likelihood Ratio Test; VL-LRT = Vuong–Lo–Mendell–Rubin likelihood ratio test.

As a result, a three-class model was chosen. Although a seven-class model produced a non-significant result, thus suggesting the six- and five-class models should be considered, we selected the three-class model due to the better data interpretability. From a statistical point of view, comparing the three models did produce a significantly improved score for the BIC/AIC values. However, a significant drop was registered in observing two and three-class solutions, whereas the slope in solutions 4-6 classes is less steep. In addition, comparing the five-, six- and three-class solutions did not yield any new information about the students favouring the five or six groups. Also, the three-class model provides suitable parameters on the classification probabilities for the most likely latent class membership (class1 = 0.931, class2 = 0.957 and class3 = 0.940). The proposed three-class model was validated using Geiser's (2013) recommendation of the best log-likelihood value repetition.

The first group gathers students who perceive math as a domain that pulls them away from other activities they may be doing, requires too much of their energy and effort, or they simply do not wish to be involved with math. Mathematics is not interesting and not perceived as useful, personally relevant, or something one might be good at. We label the profile as the high-cost group (15.4%).



Note. Y-axis represents standardised mean estimates for each profile.

Figure 1. Overview of the three profiles

The second group (53.6%) can be labelled as indifferent. These students do not seem to reveal either a positive or negative set of features. Instead, they are slightly

higher on the cost dimension, while their scores are lower on other dimensions but still close to zero. However, their observed pattern, quantitatively and qualitatively, differs from the previous group (see Figure 1).

The last student group (30.9%) gathers students who observe math as personally relevant to them and care a lot about learning different things in math. They are genuinely interested in mathematics and enjoy doing math tasks, while math is one of their favourite subjects. To these students, mathematics as a domain is useful. Grappling with math does not take them away from other activities; overall, they perceive themselves as competent in mathematics and able to solve math tasks more efficiently than their peers.

Country, Grade and Boy/Girl Differences Between the Profiles

Further analyses reveal significant cross-country differences (χ^2 = 23.489(4), p < 0.001). Notably, the high-cost profile is over-represented among the students in Norway and less presented in Portugal. The motivated profile is also underrepresented in the Norwegian subsample (see Table 3 for details).

Table 3. Student profiles comparison across countries and grades

	High-cost profile			Indifferent profile			Motivated profile		
country	**Norway**	**Portugal**	**Serbia**	**Norway**	**Portugal**	**Serbia**	**Norway**	**Portugal**	**Serbia**
% (st.res.)	20% (2.1)	11% (-2.1)	15.5% (0)	58.4% (1.0)	54.7% (0.1)	50.6% (-1.0)	21.5% (-2.9)	34.3% (1.4)	38.9% (1.4)
Grade 3 overall % (st.res.)	13.3% (-1.1)			50.1% (-0.9)			35.8 % (2.0)		
Grade 3 by country (st.res.)	-1.2	0.4	-0.8	-0.1	-1.7	0.3	1.2	1.9	0.2
Grade 4 overall % (st.res.)	12.7% (-1.4)			55.7% (0.4)			31.6% (0.5)		
Grade 4 by country (st.res.)	-0.6	-2.4	0.1	0.9	0.6	-0.5	-0.9	0.7	0.5
Grade 5 overall % (st.res.)	21.2% (2.7)			56.1% (0.5)			22.7% (-2.6)		
Grade 5 by country (st.res.)	1.6	2.2	1.7	-0.8	1.3	0.3	-0.3	-2.9	-0.8

Note. st.res.= Standardised residual. The value is considered statistically significant when the residual value is above 1.96 in absolute numbers. Grade differences per country: Norway (χ^2 = 8.135(4), p = 0.087); Portugal (χ^2 = 28.131(4), p < 0.001) and Serbia (χ^2 = 2.470(4), p = 0.650).

Significant differences were established across grades (χ^2 = 22.157(4), p < 0.001), with considerably more grade three students present in the motivated profile. Contrary to that, grade five students were saturated by the high-cost group. However, no significant differences across grades were found for Norway and Serbia when observing results by country. Instead, the pattern of the overall sample was confirmed only for Portugal (see Table 3 for details). There were no statistically significant differences between boys and girls regarding profile saturation; both boys and girls had an equal chance of belonging to any of the three profiles.

Table 4. Student profiles and differences between boys and girls

Student profiles	Estimate (S.E.)	*p*
Indifferent profile	1.054 (0.211)	0.563
Motivated profile	1.178 (0.176)	0.271

Note. The reference profile is the High-cost profile.

Relationship Between the Profiles, Math Identity and Enjoyment of Math

Analyses of the relationship between the profiles and enjoyment of math indicate significant differences between the profiles themselves. Students belonging to the motivated profile report the highest perceived enjoyment of mathematics. Contrary to that, the high-cost profile reports the lowest scores. The same pattern is observed when comparing the profiles on math identity. All profile comparison tests for math identity and enjoyment of math were significant (see Table 5 for details).

Table 5. Student profiles, enjoyment of mathematics and mathematics identity

Student profiles	Enjoyment of Mathematics Estimate (S.E.)	Mathematics identity Estimate (S.E.)
High-cost profile (HC)	-0.912 (0.058)	-0.740 (0.052)
Indifferent profile (I)	-0.089 (0.025)	-0.149 (0.027)
Motivated profile (M)	0.626 (0.039)	0.595 (0.031)

Note. (a) comparison tests for the enjoyment of mathematics – HC vs. I ($\chi2$ = 160.005(2), p < 0.001); HC vs. M ($\chi2$ = 479.797 (2), p <0.001); I vs. M ($\chi2$ = 223.034 (2), p < 0.001); (b) comparison tests for mathematics identity – HC vs. I ($\chi2$ = 97.555 (2), p < 0.001); HC vs. M ($\chi2$ = 4 95.568 (2), p < 0.001); I vs. M ($\chi2$ = 311.639 (2), p < 0.001).

DISCUSSION AND IMPLICATIONS

Fostering motivation during school years is of the highest importance from the first years of primary education and continues to be relevant, especially during transition periods, such as primary school years to lower secondary school (Boekaerts & Pekrun, 2015; Eccles & Wigfield, 2020; Raufelder et al., 2022; Wigfield & Eccles, 2020). Recent developments in the EVT emphasise that students' expectancies and values are largely shaped by situational components, such as the school environment (Rosenzweig et al., 2019; Wigfield & Eccles, 2020).

In that context, person-centred studies using EVT can offer more nuanced information on how task values and/or expectancies of success not only contribute to overall student motivation but also if there are subgroups of students among whom these components are combined differently (Raufelder et al., 2022). All of these are valuable resources to teachers, as their actions can be targeted differently towards students that experience high costs in grappling with math compared to students who may exhibit higher values on the intrinsic and attainment components.

With the former in mind, this chapter examined students' motivational profiles in grades three to five. Results indicated that three distinct profiles were discerned, combining mixed (i.e., high-cost and motivated groups) and cohesive profile solutions (i.e., indifferent group). Given the fact that, among the task values, cost was included as one of the dimensions, proposed solutions yielded this dimension as one of the distinctive features in two out of the three profiles, similar to the findings of Dietrich and Lazarides (2019) and Raufelder et al. (2022).

Even though the perceived competence was part of the profile solutions, differences between boys and girls were not captured in the overall sample, even if the general trend favouring boys was reported in earlier studies (Geary et al., 2019; Nagy et al., 2010). Similar to Radišić et al. (2023), country-specific patterns were found. While all the profiles were discerned across the countries included in the analyses, with the indifferent profile being the dominant one, in Norway, the motivated group is underrepresented, while the high-cost profile is overrepresented.

When profiles are examined with grades in mind, a trend of less representation of the motivated group and a more present high-cost profile is visible for grade five. Given the features of these two profiles, this is aligned with the declining

trend of more favourable motivational components, such as intrinsic value, as the students grow older (Eccles & Wigfield, 2020; Wigfield & Eccles, 2020). However, observing this phenomenon at the country level confirmed the pattern only for Portugal. Both Serbia and Portugal experience a transition from class teaching to subject teaching from grades four to five, whereas, in Norway, the setting remains unchanged for the students. A distinctive feature of the Portuguese system is that students also change schools in their transition to subject teaching. In contrast, the classes remain intact in Serbia, and the school surroundings remain the same. Given the effect that the school environment can have on students' expectancies of success and task values (Rosenzweig et al., 2019; Wigfield & Eccles, 2020), the result in Portugal can also reflect students' adjustment to the new school environment and thus explain the prevalence of the high-cost profile in grade five.

Finally, the relationship between the profiles, math identity, and enjoyment of math was observed. Results indicated that students in the motivated profile reported the highest values regarding enjoyment of math (King et al., 2015) and stronger math identity (Graven & Heyd-Metzuyanim, 2019; Wan et al., 2021; Wigfield et al., 2006). Such a result is aligned with the idea that identity beliefs can significantly affect student engagement in school activities (Wan et al., 2021) since the motivated group reported the highest scores on both the identity component and enjoyment of math. However, the results also revealed that the cost dimension could be more detrimental to engagement and identity features, as students in the high-cost group also scored significantly lower on these compared to students in the indifferent profile. Such a result implies that students belonging to the high-cost group indeed require more nuanced support in developing an array of positive motivational and affective relations towards math, compared to students who seem indifferent but whose perceptions do not hold any negative value (Raufelder et al., 2022).

LIMITATIONS AND FURTHER RESEARCH

While this study was driven by the need to gain more information on diverse student profiles at lower grade levels, our data focus on students. We have not analysed any of the class or school environment features. In addition, the study relied on self-reported data from students and did not consider, for example, the

ratings of teachers concerning students' motivation or enjoyment of mathematics in class. While we have sampled students from different countries, our sample is not representative of the countries involved, which limits our conclusions when we speak of country-specific patterns. However, the current study does lay the foundation for some future orientation of our work. At the student level, it would be interesting to expand the array of achievement emotions examined to anxiety, especially observing reported levels for the high-cost profile. Future endeavours could also include some teacher levels ratings, especially concerning the classroom environment and teachers' perception of students' motivational components. Finally, it would be noteworthy to investigate the stability of the discerned student profiles across time and the extent to which student positions remain the same within the profiles.

CONCLUSIONS

Overall, the current study contributes to person-centred studies within the EVT framework. It addresses several research gaps since it (a) considers all four task values, (b) examines motivational profiles across countries, (c) focuses on primary-age students below year six, and (d) examines potential differences in achievement emotions (i.e., enjoyment) and mathematics identity. The findings emphasise that cost value has a vital role in differentiating between students' motivational profiles (i.e., motivated group and high-cost group). Distinct country patterns for Portugal may have implications for the latest developments in EVT, advocating for situational aspects of students' motivational beliefs (Wigfield & Eccles, 2020).

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CHARACTERISTICS OF HOME LEARNING ENVIRONMENT RELATED TO STUDENTS' MOTIVATION TO LEARN MATHEMATICS IN GRADES 3-5

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Abstract. Student motivation has gained considerable attention in recent years. The aims of this paper are to assess students' motivation related to learning mathematics in primary school (grades 3–5), and to identify possible relations between students' motivation to learn mathematics, and parents' practices at home supporting that process. Background data and assessments of mathematics motivation were collected from 464 students and 536 parents from Estonia through questionnaire surveys. The results showed that students feel the high cost of studying mathematics, which is associated with various home environment variables. In addition, a number of significant relations appeared between students' motivation to learn mathematics and activities of parents. Parental actions which are supposed to guide students to learn mathematics are positively related to students' perceived cost of learning mathematics. The results of the study are helpful in planning better support for developing students' motivation.

Keywords: mathematics, motivation to learn, home learning environment, primary school.

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INTRODUCTION

Mathematical competence is important for academic success in coping with life, solving problems, and developing analytical skills, and it is related to income and decision-making skills (Johanson et al., 2021; Rittle-Johnson, 2017). Recent studies have urged researchers to pay more attention to motivational aspects in developing mathematical competence (Johanson et al., 2021; Silinskas & Kikas, 2019). Motivation to learn mathematics is related to various factors, among which home learning environment has attracted a lot of attention (Anders et al., 2012; Tan et al., 2020; Šimunović & Babarović, 2020). The aims of the study are to evaluate the motivation of Estonian 3rd to 5th grade students to learn mathematics and to identify possible relations between their motivation and characteristics of the home learning environment, in particular parents' beliefs and activities.

Motivation to Learn Mathematics

Motivation can be defined as a desire to act, which prompts people to do something (Ryan & Deci, 2000a). We use the expectancy-value theory (Eccles & Wigfield, 2000, 2020) for conceptualizing motivation in this study. Building on the work of Atkinson (1957; in Wigfield & Eccles, 2000), Eccles et al. (1983) proposed an expectancy-value theory of achievement performance and examined it in mathematics achievement. According to expectancy-value theory, expectations and values directly affect the choices that affect achievement, performance, effort, and persistence (Eccles & Wigfield, 2000, 2020). There are two central principles in the expectancy-value theory: (1) expectations for achievements are related to people's own beliefs about the possibility of completing a task; and (2) self-efficacy judgments are related to beliefs about one's competence in each domain (in the case of this study, mathematics) (Eccles & Wigfield, 2000, 2020). Expectations and values also influence performance, effort, and persistence, and they are, in turn, influenced by task-specific beliefs, perceived difficulty of various tasks, and individuals' own goals (Eccles et al., 1983). Eccles and Wigfield (2000) find that students' learning results and achievements are related to how much the task is valued and what the students' own expectations are for the success of solving the task.

In the expectancy-value theory, values are divided into four components: (1) attainment value, i.e. how important is the performance of given tasks, its success; (2) intrinsic value, i.e. internal satisfaction resulting from the performance of tasks; (3) utility value, i.e. how important tasks are for the fulfilment of a person's other goals related to the future; and (4) cost value, i.e. how solving the tasks limits doing something alternative, what effort the task requires, and what the emotional cost of solving it is (Eccles et al., 1983, Wigfield & Eccles, 2000). More specifically, Eccles et al. (1983) defined success expectancies as children's own beliefs about how well they will cope with upcoming tasks in the near or long term; and ability-related beliefs as an individual's perception of his/her current competence to carry out a given activity. Eccles and Wigfield (2000, 2020) consider that students' results and achievements are governed by how much the task itself is valued and what the students' own expectations are for the success of solving the task. Compared to other frameworks, the expectancy-value theory deals more with the environment affecting children, the people around them, and task-specific beliefs.

Characteristics of Home Learning Environment – Related to Motivation to Learn Mathematics

Mathematics learning motivation is influenced by the home learning environment (Anders et al., 2012), parents' level of education, their occupation, income (Gustafsson et al., 2013) and parental help and control in doing homework (Silinskas & Kikas, 2019). The home learning environment is related to the availability of learning materials (including books) and parents' activities: reading to children, using complex language, playing with numbers, counting, and taking children to the library (Anders et al., 2012). Students whose parents have a higher level of education, a more prestigious occupation, or a higher income tend to have higher academic results than students whose parents have a lower position according to indicators of socioeconomic status (Gustafsson et al., 2013).

In several studies, it has been found that parents' socioeconomic background, educational level, cultural habits (e.g., literacy and reading) influence their children's success in education (Gustafsson et al., 2013). At the same time, it has been found that the influence of the mother's education and socioeconomic background decreased when the home learning environment was included in the analysis model, which means that the family background only partially affects

mathematical literacy (Anders et al., 2012). Among other things, Eccles and Wigfield (2020) have investigated home learning environment characteristics that influence student motivation in their research. The characteristics of the parents, the family, and the child affect the parents' beliefs about their children, as well as the socio-emotional climate of the family, the general parenting style, and the parents' behaviours are related to the child's motivation, beliefs, and values (Eccles & Wigfield, 2020). These relationships, which influence students' motivation, are very complex, especially in terms of how the characteristics of parents and family, as well as the students themselves, affect other factors (Eccles & Wigfield, 2020).

Parents' levels of education and gender are also related to the number of books at home and how accessible they are to children, and this, is related to children's general activity in solving homework (Gustafsson et al., 2013). Parents are role models for students – their attitude towards mathematics and teaching skills can influence students' level of mathematics anxiety and mathematics results (Chang & Beilock, 2016). They contribute to their child's mathematics studies by conveying confidence in their abilities and showing interest in their children's progress and schoolwork (Rodríguez et al., 2017). Parental expectations and involvement in math-related activities also have an impact on students' motivation to study mathematics (Chang & Beilock, 2016).

Parents' involvement in learning practices that take place at home are one of the factors that shape student motivation (Silinskas & Kikas, 2019). Confidence in children's abilities to handle homework and learn from their mistakes is related to perceived self-efficacy in mathematics (Rodríguez et al., 2017). However, the benefits of home support may inadvertently backfire when parents are highly anxious about mathematics (Chang & Beilock, 2016).

Parental control over homework means pressure and control on students to complete tasks, and parental support means help, and its value is determined by their children (Silinskas & Kikas, 2019). Direct instruction and control of children's academic learning can directly influence students' motivation to learn mathematics (Rodríguez et al., 2017). Supporting student autonomy is associated with high emotional support and low psychological control (Silinskas & Kikas, 2019). Perceived parental control can inhibit motivation by undermining feelings of autonomy, competence, and connectedness, while parental support can increase it (Levpušček & Zupančic, 2009; Silinskas & Kikas, 2019). Parental control is generally inhibiting, and the enhancing effect of support is subtler and

may depend on many child and parent characteristics (Ryan & Deci, 2000b). Autonomy-supportive parents have children who are more intrinsically motivated than controlling parents (Grolnick et al., 1997; according to Ryan & Deci, 2000b).

Drawing on the theoretical framework outlined above, the aims of the current study are: (1) to evaluate the motivation of Estonian 3rd to 5th grade students to learn mathematics and (2) to identify possible relations between students' motivation to learn mathematics and characteristics of the home learning environment, including parents' beliefs and activities. Consequently, we were seeking to answer the following research questions:

(1) How do 3rd to 5th graders evaluate their motivation to learn mathematics? What possible differences occur between grades?
(2) What is the relationship between home learning environment factors, namely parents' practices, and 3rd to 5th grade students' motivation to learn mathematics? What possible differences occur between grades?

METHOD

Sample

The current study is part of the longitudinal project "Co-constructing mathematics motivation in primary education – A longitudinal study in six European countries" (MATHMot), which looks at the development of motivation to learn mathematics and factors affecting this process. The MATHMot project is an international study conducted in Norway, Finland, Sweden, Portugal, Serbia, and Estonia. The current study uses data from the project's pilot study in Estonia. The nine schools participating in the study were selected from different regions of Estonia. The sample included the first and second stages of primary school (grade 3 is at the end of the first stage and grades 4-5 are in the second stage). In the present study, students from 9 to 13 years and their parents participated in the study. This amounted to 464 students – among them were 169 third-grade students, 170 fourth-grade students, and 125 fifth-grade students.

A total of 537 parents participated in the study: 200 parents of 3rd grade students, 194 parents of 4th grade students, and 143 parents of 5th grade students. The number of parents was higher because some students who had

agreed to participate were absent from school during data collection. Most of the parents had at least secondary or vocational education as their highest level of education. Many parents had higher education (mothers, stepmothers, and female guardians 55.5%; and fathers, stepfathers, and male guardians 37%). Also, most of the parents were employed, but about 8% of the parents were unemployed.

Instruments and Data Collection

Motivation to learn mathematics was measured with an Expectancy value scale (EVS) (Radišić et al., 2022) comprising five dimensions. Four dimensions of the EVS scale include four task values: interest (example item "I like doing math"), utility (example item "When I grow up, it will be useful to know math"), attainment (example item "I don't care about math"), and cost (example item "When I do math, I would rather be doing other things"), while the fifth dimension targets expectancy domain through perceived competence (example item "Math is easy for me"). EVS shows a good fit (CFA = 0.958, TLI = 0.953, RMSEA = 0.041, WRMR = 2.525), which was also confirmed on Estonian data (CFA = 0.964, TLI = 0.959, RMSEA = 0.042, SRMR = 0.065). Besides the data on students' motivation, information on student age, gender, and number of books was collected.

A scale to investigate parent activities related to supporting child motivation was developed, based on the motivation to learn mathematics questionnaire. In line with the motivation to learn scale, five dimensions were specified: interest and value (example item "I show my child how fun math can be"), cost (example item "I tell my child to make time for learning math"), perceived competence (example item "I encourage my child to feel confident when doing his/her homework"), structure (example item "I help my child to organize work when learning math"), support (example item "I help my child with strategies how to learn math"). The scale shows an adequate fit (CFA = 0.928, TLI = 0.911, RMSEA = 0.078, SRMR = 0.049), which was also confirmed on Estonian data (CFA= 0.919, TLI = 0.912, RMSEA = 0.073, SRMR = 0.061). The internal reliability of the scale used in the study is outlined in Table 1. The parents' questionnaire also collected background data on the gender of the respondent, the education and occupation of the student's parents, and the home language.

The study was conducted with the approval of the Human Research Ethics Committee of the University of Tartu.

Table 1. Scales used in the study

	Cronbach's α	Number of items
Student questionnaire		
Motivation to learn mathematics		
Interest	.890	6
Cost	.731	4
Attainment	.808	6
Utility	.843	6
Perceived competence	.866	6
Parent questionnaire		
Activities related to students		
Interest and value	.721	4
Cost	.803	3
Perceived competence	.718	3
Structure	.761	5
Support	.719	3

Data Analysis

First, descriptive statistics (means and standard deviations) were calculated. Second, Pearson's linear correlation coefficient and Spearman's rank correlation coefficient were used to investigate the relationship between factors. Then, the non-parametric tests and post hoc tests for independent characteristics were used for inter-class comparisons between several groups.

RESULTS

Students' Motivation to Learn Mathematics

The first research question sought an answer to the question of how 3rd-grade to 5th-grade students assess their motivation to learn mathematics and which possible differences occur across grades. The results for students' motivation across grades in presented in Table 2.

Table 2. Students' motivation to learn mathematics

	3rd grade			4th grade			5th grade		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Interest dimension	157	3.07	.657	166	2.71	.714	120	2.54	.583
Cost dimension	164	2.11	.713	165	2.29	.689	123	2.38	.428
Attainment dimension	163	3.35	.498	161	3.22	.544	120	3.22	.333
Utility dimension	162	3.64	.442	165	3.44	.511	120	3.28	.538
Perceived competence dimension	160	2.89	.640	164	2.69	.683	122	2.74	.329

Notes. N – number of students, Mean – arithmetic mean, SD – standard deviation,

There was a statistically significant difference in all of the students' motivation dimensions between grades as determined by Welsh ANOVA: interest dimension ($F(2) = 21.911$, $p < .01$); cost dimension ($F(2) = 5.906$, $p < .01$); attainment dimension ($F(2) = 11.952$, $p < .01$); utility dimension ($F(2) = 17.988$, $p < .01$); and perceived competence dimension ($F(2) = 4.233$, $p < .05$). A Games-Howell *post hoc* test revealed that the differences are statistically significant in interest dimension between 3rd and 4th; 3rd and 5th grade; in cost dimension between 3rd and 5th grade; in attainment dimension between 3rd – 5th grade; in utility dimension between all grades (3rd and 4th; 4th and 5th; 3rd and 5th); and in perceived competence dimension between 3rd and 4th grades. It can be concluded that the differences between grades were significant in all students' motivation to learn mathematics dimensions, and especially between 3rd and 5th grades.

The Relations Between Motivation to Learn Mathematics and Characteristics of the Home Learning Environment

The second research question sought to find out how characteristics of the home learning environment are related to 3rd to 5th grade students' motivation to learn mathematics, and what possible differences occur between grades.

Socioeconomic Background

In terms of socioeconomic background, information was sought from the respondents through the number of books at home. For 3rd grade students there was a weak positive correlation between socioeconomic background and the utility dimension of mathematics ($r = .180$; $p < .05$). Low correlations were also

found between socioeconomic background and interest dimension (r = .218; p < .01), socioeconomic background and relative cost dimension (r = -.171; p < .05) and socioeconomic background and perceived competence dimension (r = .204; p < .01) among the 4th grade students. Regarding to 5th grade students, low positive correlation was found between socioeconomic background and the utility factor (r = .190; p < .05).

Parents' Educational Level

Spearman correlation analysis was carried out to investigate the relationship between parents' levels of education and students' motivational factors. Low positive correlations between the father's education and students' interest (ρ = .145; p < .01); father's education and students' attainment (ρ = .100; p < .05); father's education and students' utility (ρ = .136; p < .01); and father's education and students' perceived competence (ρ = .145; p < .01) were found. It was found that mothers' highest educational level does not have a statistically significant relation with any of the students' motivation to learn mathematics dimensions.

Parents' Activities in Supporting Learning Mathematics

The results of the study revealed that, according to means, parents are involved in students' homework quite a lot (see Table 3).

Table 3. Parents' activities regarding students' homework

	3rd grade			4th grade			5th grade		
	N	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**
Verification	168	4.29	.863	170	4.19	.991	124	3.85	.960
Help	167	3.22	1.051	170	3.06	1.010	124	2.83	1.002
Checking correctness	168	3.15	1.229	169	2.91	1.119	124	2.65	1.082

Notes. N – number of students, Mean – arithmetic mean, SD – standard deviation

Following this, we examined the relations between parents' activities related to students' homework and students' motivation to learn mathematics. For the 3rd grade there was no statistically significant correlation between parents checking if homework is done and any of the students' motivation dimensions. For 4th grade students', we found low negative correlations between the students' interest

dimension and parents asking if the homework is done ($\rho = -.169$; $p < .05$); and between students' perceived competence dimension and parents checking if homework is done ($\rho = -.219$; $p < .01$). In the case of 5th grade students, there was no statistically significant correlation between parents checking if homework is done and any of the students' motivation dimensions.

Regarding parental help with mathematics homework, for the 3rd grade there occurred statistically significant correlations between parents helping their children with math homework and students' relative cost dimension ($\rho = .218$; $p < .01$); and also, between parents helping their children with math homework and students' perceived competence dimension ($\rho = -.320$; $p < .01$). For 4th grade students', we found no statistically significant correlation between parents helping their children with math homework and students' utility dimension. We found statistically significant correlation between parents helping their children with math homework and students' interest dimension ($\rho = -.200$; $p < .01$), students' relative cost dimension ($\rho = .297$; $p < .05$), students' attainment dimension ($\rho = -.172$; $p < .05$), and students' perceived competence dimension ($\rho = -.236$; $p < .01$). In the case of 5th grade students, there were no statistically significant correlations between parents helping their children with math homework and students' attainment and utility dimensions. We found a statistically significant correlation between parents helping their children with math homework and students' interest dimension ($\rho = -.271$; $p < .01$); students' relative cost dimension ($\rho = .264$; $p < .01$); and students' perceived competence dimension ($\rho = -.459$; $p < .01$).

For the 3rd and 4th grades there was no statistically significant correlation between parents checking if homework is done correctly and any of the students' motivation dimensions. Regarding the 5th grade, we found a statistically significant correlation between parents checking if homework is done correctly and students' perceived competence dimension ($\rho = -.301$; $p < .01$).

The Kruskal-Wallis' test results showed that there are no statistically significant differences between grades regarding parental help with mathematics homework. According to the Kruskal-Wallis' test performed for between-grade comparisons, it can be seen that verification (checking if the homework is done) is similar in the 3rd and 4th grade but decreases in the 5th grade ($\chi 2(2) = 15.235$, $p < 0.001$, with a mean rank of 270.72 in 3rd grade, 291.73 in 4th grade and 229.90 in 5th grade). Pairwise comparison showed statistically significant difference

between 4th and 5th ($F(2) = 52.668$, $p < .05$); and 3rd and 5th grade results ($F(2) = 41.880$, $p < .05$). Parents check if the homework is done correctly the most in the 3rd grade, less in 4th, and least in 5th grade ($\chi 2(2) = 10.648$, $p < 0.005$, with a mean rank of 292.11 in 3rd grade, 261.36 in 4th grade and 239.65 in 5th grade). Pairwise comparison showed a statistically significant difference only between 3rd and 5th grade results ($F(2) = 58.702$, $p < .05$).

Parents' Practices in Supporting Learning Mathematics

The mean scores of the dimensions of parents' practices in relation to their children's mathematics learning are presented in Table 4. According to the one-way ANOVA test, there was no statistically significant difference between grades of the students and parents' cost dimension activities. For the parents' practices interest and value dimension there is statistically significant difference between 3rd and 5th grade students' parents ($F(2) = 6.304$, $p < .05$). In the case of parents' perceived competence practices, there is a statistically significant difference between 3rd and 5th grade students' parents ($F(2) = 4.123$, $p < .05$). Regarding parents' practices of the structure dimension, we found statistically significant difference between 3rd and 5th grade students' parents ($F(2) = 6.245$, $p < .05$); and also between 4th and 5th grade students' parents ($F(2) = 6.245$, $p < .05$). In the case of parents' practices in the support dimension, we also found statistically significant difference between 3rd and 5th grade students' parents ($F(2) = 13.240$, $p < .01$); and also between 4th and 5th grade students' parents ($F(2) = 13.240$, $p < .01$).

Table 4. Parents' practices in supporting learning mathematics

	3rd grade			4th grade			5th grade		
	N	**Mean**	**SD**	**N**	**Mean**	**SD**	**N**	**Mean**	**SD**
Interest and value	165	2.59	.599	169	2.50	.611	123	2.34	.632
Cost	164	2.49	.811	167	2.58	.832	122	2.51	.822
Perceived competence	166	3.12	.699	166	3.08	.705	124	2.89	.711
Structure	168	2.18	.628	169	2.13	.697	122	1.92	.640
Support	167	3.03	.590	170	3.07	.687	124	2.69	.715

Notes. N – number of parents, Mean – arithmetic mean, SD – standard deviation

DISCUSSION

The findings of this study reveal statistically significant differences in motivation between students in the first and second stages of primary education. Specifically, the study shows a decrease in students' interest, attainment, and perceived utility in learning mathematics, accompanied by an increase in the relative cost associated with learning mathematics. Our results demonstrate that students' socioeconomic background and parents' activities regarding learning mathematics are also correlated with students' motivation to learn mathematics.

In relation to the first research question, which explored students' motivation to learn mathematics, the results revealed that in terms of interest in learning mathematics and doing mathematics tasks, 3rd grade students had the highest interest and 5th grade students had the lowest interest. Students of the 5th grade assessed the greatest cost of learning mathematics and they found that mathematics take more time, and at the expense of this, they cannot do something else that interests them. Gaspard et al. (2017) also found that in mathematics students reported a high levels of cost. In our study, good achievements in mathematics were most important for 3rd grade students and least important for 5th grade students. It has been found in previous research that younger students are quite optimistic about their competences and value school achievement, but this changes during middle childhood (Wigfield & Eccles, 2020). A similar tendency was also evident regarding the utility of mathematics, as the results of the study revealed that mathematics seemed more useful to 3rd grade students than to 4th and 5th grade students. These findings are consistent with previous research, where it was stated, that older students have less positive subjective task value than younger students (Gaspard et al., 2017; Saks & Leijen, 2020). The average perception of one's own perceived competence in mathematics were more similar for 3rd to 5th grade students in contrast to other components of motivation. The difference occurred only between 3rd and 4th grades. It can be assumed that the decrease in motivation between grades 3-5 can be derived from the changes, which students experience during this time and the cost of learning may increase because the amount of work in transition grades increase continually. Overall, it can be concluded, based on the current study and based on previous research (Fredricks & Eccles, 2002; Gottfried et al., 2001), that students'

motivation to learn mathematics is higher in their first schoolyears and starts to decline afterwards.

Related to the second research question, which explored possible relationship between students' motivation and different aspects of the home learning environment, we found several interesting results. For example, the results revealed a weak statistically significant relationship between fathers' educational level and students' motivation across four dimensions (interest, attainment, utility, and perceived competence). When examining the socioeconomic background, a positive correlation was revealed between the utility factor of 3rd and 5th grade students and the interest of 4th grade students in learning mathematics, and a negative correlation between household income and the cost of learning mathematics for 4th graders. Previous research has shown that students whose parents have a higher level of education or higher income tend to have higher motivation to learn (Ersan & Rodrigues, 2020; Gustafsson et al., 2013). It can be argued that students whose parents have a higher socioeconomic status see the utility of mathematics and are more interested to it than students who have lower socioeconomic status; and therefore, as parents direct their children to spend time for learning mathematics, they feel the greater cost of it. However, only weak correlations between parental education level, income, and students' motivation to learn mathematics emerge from the present study. It could be related to comprehensive school system in Estonia, which is known for aiming at the high level of equality of education (Johanson et al., 2021).

The results of the current study revealed that parental checking of mathematics homework, both in terms of completion and correctness, was relatively frequent in the 3rd and 4th grade but decreased significantly in the 5th grade. Statistically significant differences were shown between 3rd and 5th grade in both parents asking if the homework is done and checking if it is done correctly. Parents sometimes help students with math homework, but the tests did not show any statistically significant difference between grades. Previous studies have also shown that parental involvement in doing homework is one of the factors shaping students' motivation (Silinskas & Kikas, 2019), but at the same time, excessive worrying can backfire and reduce motivation instead (Chang & Beilock, 2016), since parental control over homework means pressure on students (Silinskas & Kikas, 2019). Based on the results of the study, it can be stated that the more time parents spend on checking and guiding students' mathematics homework,

the greater the cost of learning mathematics students feel and the more their motivation to learn mathematics decreases. It has also been pointed out previously that parental control is generally inhibitory (Ryan & Deci, 2000b). Therefore, it is important for parents to focus on helping their children in mathematics in such a way that the cognitive cost of learning mathematics does not increase, as this can significantly reduce their motivation to learn mathematics.

During the study, it appeared that parents' activities and practices related to interest, and values did not have a statistically significant relationship with the motivation of 3rd and 4th grade students. At the same time, a statistically significant negative relationship was revealed between motivation related to the perceived competence of 5th grade students and activities related to parents' interest and values, i.e., parents' activities related to interest and values in mathematics can instead inhibit 5th grade students' perception of their own mathematical competence. Similar results have been found by several authors who have pointed out that by undermining the sense of autonomy, competence, and connectedness, perceived parental control can inhibit motivation (Silinskas & Kikas, 2019; Levpušček & Zupančic, 2009). It can be assumed that such a relation arises from the feelings of a young person in a transitional age regarding helping them learn, i.e., if they are directed to be interested in mathematics or pay constant attention to it, they may get the impression that they are incompetent in this area. In such situations, it is important to direct the autonomy of 5th grade students and guide them to use their knowledge and skills in daily activities related to mathematics in such a way that they can experience success and thereby feel more competent.

Next, parental actions related to the cost of learning mathematics (for example setting aside time for learning mathematics or telling children that learning mathematics requires a lot of effort) were explored. It turned out that such activities were positively related to several different motivational factors of students (for 3rd graders, interest, and cost, for 4th graders, cost, attainment, and perceived competence, and for 5th graders, cost, and attainment). In the comparison between grades, the test results did not show statistically significant differences between grades in parents' cost-related practices. A similar relationship emerged regarding parental activities to create structure for learning mathematics and to increase mathematics competence. With such activities, the 3rd graders' sense of the utility of mathematics decreases and their sense of the cost of learning mathematics increases. Once again, these activities are related to 4th and 5th grade

students' evaluations of the cost of learning mathematics. It has been found that direct guidance and control of students' academic learning can directly influence students' motivation to learn mathematics (Rodríguez et al., 2017). Several authors have highlighted the fact that autonomy-supportive parents have children who are more intrinsically motivated compared to controlling parents (Grolnick et al., 1997; according to Ryan & Deci, 2000b). It can be argued that the appearance of such a connection is expected, because if a parent directs their child to take separate time for learning mathematics, then this also affects their perception of the cost of learning mathematics, i.e., they may feel that they spend too much time learning mathematics, at the expense of which they may not do anything some more interesting activity for them. Again, 5th grade students may feel incompetent because they feel that they need to set aside time to learn math. At the same time, it is not possible to compare the actions of parents to direct them to study other subjects, and therefore this could also be one of the following research directions.

Within this study, it was found that parental support of students in learning mathematics also increases students' evaluations of the cost of learning mathematics, and in the case of 3rd grade students, mathematics is even associated with a somewhat lower utility. It has been pointed out that the increasing effect of support can depend on many characteristics of the child and the parent (Ryan & Deci, 2000b). Therefore, it can be said that these relations and supporting students' learning at home should be further investigated, because in this way it is possible to find out which activities that support the learning of mathematics would increase students' learning motivation.

IMPLICATIONS FOR PRACTICE

The results of the current study can be used to inform parents about the importance of the home learning environment in relation to developing motivation to learn mathematics. It is important for parents to focus on helping their children in mathematics in such a way that the cognitive cost of learning mathematics does not increase, as this can significantly reduce their motivation to learn mathematics. This research provides a good starting point for discussion for giving parents the opportunity to think through their own attitude to mathematics, as well as home activities related to learning mathematics. Our findings could also be included

in existing parenting programs and to organise training by the states and local governments

Teachers have the possibility to support students' motivation. By understanding students' expectations of their achievements, teachers can guide students and choose tasks that require some effort, so that they feel they can handle them (Uibu et al., 2016). If the tasks seem too difficult for students, it can start to reduce their motivation to learn mathematics. Moreover, it is extremely important to pay attention to the cost factor of learning mathematics. Since it is difficult to change such an expense at school due to the national agreement on lessons amount, attention can be paid to the amount of homework. It is possible to reduce the amount of homework and pay attention to differentiation. It is also possible to give tasks which are suitable for the student's ability yet require sufficient effort, so that the students' cognitive cost of learning mathematics does not reduce their motivation.

Both, teachers and parents should pay attention to the fact that students who move from the primary education classroom teaching system to the subject teaching system need support and autonomy (see also Uibu & Kikas, 2014). It is important to direct the autonomy of 5th grade students and guide them to use their knowledge and skills in daily activities related to mathematics in such a way that they can feel successful and that they are more competent. Based on the results of this study, it can be argued that different parties – schools and parents – could pay more attention to the transition from the first to second stage of primary education.

CONCLUSIONS

The focus of this study was the motivation of Estonian 3rd to 5th grade students to learn mathematics and possible relations between students' motivation to learn mathematics and home learning environment, especially parents' beliefs and activities.

The results of the study revealed that, in terms of interest in learning mathematics and doing mathematics tasks, students' interest in mathematics, the importance of good achievements, and the utility of mathematics decrease by age while the cost of learning mathematics increase from grade to grade. We also

found that students' motivation to learn mathematics is associated with various characteristics related to the home learning environment. Parental actions which are supposed to guide students to learn mathematics are positively related to the students' cost of learning mathematics. It is important to continue the research about the motivation to learn mathematics to support students' development and also make suggestions for teachers, parents, and decisionmakers to create a supportive environment.

LIMITATIONS AND FURTHER RESEARCH

When interpreting the results of the study, it is important to consider some limitations. The main limitation is the convenience sample that does not allow generalization of the results to all 3rd to 5th graders in Estonia. It should also be taken into account that the data collection took place in the spring of 2021, i.e., by then the students had already been in distance learning for the second spring due to the COVID-19 pandemic (see Lepp et al., 2021). Being in distance learning for a long time could affect the motivation of both students and parents and home activities related to studies.

Future studies could look at whether the behaviour of parents in supporting homework differs by subject and what kind of relation it has with students' learning motivation. It is also important to investigate the key components of students' motivation to learn mathematics in order to help them succeed. Future research aims to find out how is it possible to create the best learning environment for the students' in order to have high motivation to learn mathematics.

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