

PARTICIPATORY APPROACHES TO EDUCATIONAL TECHNOLOGY 1

University of Tartu
Faculty of Social Sciences
Institute of Education
Curriculum of Master's Programme in Educational Technology

Tumanov Tatiana

**“Participatory Approaches to Educational Technology: Navigating Temporary
Solutions and Strategic Developments during the Pandemic”**

MA thesis

Supervisor: Prof. Emanuele Bardone

Presented by
Tatiana Tumanov
2023

Abstract

The study explores the vital role of educational technologies in transforming informal education during the COVID-19 pandemic, utilising the Educational Design Research methodology for comprehensive analysis. It presents a case study of EnerJew, highlighting the transition from a blended learning format to a fully online model. This shift incorporates a novel mobile app designed using value-based principles to maintain the project's ethos. Evaluating the temporary solutions and the mobile app's effectiveness, the study provides essential insights into the potential evolution from emergency responses to long-term strategies. Moreover, a unique feedback-gathering system was designed and implemented, underscoring the importance of understanding and optimising system effectiveness. This research contributes to a deeper understanding of digital technology, collaborative learning, and user interaction in crisis-driven informal educational contexts.

Table of Content

1. Introduction	4
2. Theoretical Research and Literature Review	5
2.1. Blended Learning Models	6
2.2. Peculiarities of the blended learning format and its pedagogical challenges	8
2.3. Educational Theories Aspects: What Did We Rely on?	10
3. Research Question	14
4. Methodology	15
5. Results	18
5.1. Defining the Challenges during Pandemia	18
5.2. Findings from In-depth Interviews with Teenagers	20
5.3. Quick and Temporary Solutions	26
5.4. How to Break Through Info Noise? Solutions for Information Channels in Informal Education	30
5.5. Mobile App Development	32
6. Discussions and Conclusions	40
6.1. Evolution of Temporary Solutions and Mobile App Over Time	42
6.2. Personal Reflection	43
7. Author's Declaration	45
8. Bibliography	46
9. Appendices	51
9.1. Table 1. Number and Ratio of Educational Sessions Held from March to May 2020	51
9.2. Table 2. Use of Most Used Technological Tools in Different Educational Formats at March 2020	52
9.3. A Questioner for the Interviews with Teenagers	53

1. Introduction

Louis Kahn, the renowned American architect known for his school building designs, once said, "Schools began with a man under a tree who did not know he was a teacher, sharing his realisations with a few others who did not know they were students." I believe that the essence of education lies in this statement: the beauty of human interaction, dialogue, and the sharing of knowledge, questions, and experiences that form the foundation of educational activities throughout history.

In today's world, life and our surroundings are constantly changing, making the role of an educator an unprecedented intellectual and social challenge. I embarked on this research in the early days of the COVID-19 pandemic, which plunged people worldwide into physical isolation, stressful uncertainty, and a flurry of digital connections and online experiences. As I craft the concluding remarks of this paper, I find myself amidst the 16th month of the war in Ukraine, confronted by disconcerting news and distressing narratives of human dehumanisation, loss, and disconnection from familiar supportive environments and educational institutions. Over these past three years, the pursuit of a Master's Degree in Educational Technologies has been closely interwoven with my professional experiences in education and my desire to help educational institutions in realising their mission in a new world – where educational activities have become unimaginable without technology for an enormous number of people. This Master's thesis aims to contribute to the burgeoning body of knowledge in the field of educational technology, specifically the application of participatory learning principles within a digital framework.

This research aims to explore the potential of technology as an enabler in informal educational practices, with particular emphasis on digital platforms supporting collaborative learning. The unfolding of this study, thus, aims to understand the integration and effectiveness of such technologies in the current educational landscape marked by significant upheavals and disruptions due to the pandemic and socio-political scenarios.

This research is a reflection of a personal journey, the professional insights gained, and the collective experience of developing a digital platform that seeks to embody an ethos of collaborative learning. The pursuit of this research serves not just to fulfil the requirements of a Master's Degree in Educational Technologies, but also to provide a valuable resource for

other education professionals intrigued by the intersections of digital technology, collaborative learning, and user interaction. It narrates the tale of an educational technologist's journey during a global pandemic and a regional war, weaving together the threads of personal experiences, academic learning, and professional growth. This document is the culmination of an endeavour to understand and articulate how technology can sustain educational practices within a distinct educational integrity, encapsulating the educational approach, methodology, values, assessments, evaluation criteria, and feedback focus.

2. Theoretical Research and Literature Review

At the beginning of the development process, we explored theoretical research of blended learning themes for support. We had to move most educational activities to this format and hoped to master it thoughtfully.

Studies and publications in Blended learning, given that they are relatively recent, cover a reasonably extensive range of educational forms and projects and often aim to describe and analyze current practices in this area. Interestingly, the research on blended education cases relates more to schools and universities, while briefing books refer to adult education within companies and in business.

Most authors who write about blended learning refer in its primary definition to Michael Horn (Horn, 2014), who identified it through a set of necessary characteristics, such as:

- Blended learning includes teaching and learning as part of the official educational program;
- Students learn, at least in part, through online content and learning;
- Students, to some extent, have control over time, place, way and pace of study;
- Part or all of the instruction is delivered away from home in a controlled, brick-and-mortar place;
- It is essential for different modes of study within the course or subject to be linked to provide students with an integrated educational experience.

Later, Simon and colleagues (Simon et al., 2017) state that “the blended learning approach combines *the best elements of online learning and face-to-face*. It is likely to be the

predominant model in the future and become much more common than each component”. Keengwe (Keengwe, 2018) describes blended learning as an experience that can be adapted to a specific audience, and that is not limited by space or time. He explains that this means the audience learns at least part of the time in the classical educational space and the other part with the help of an online environment that controls its own time, place, path and rhythm. Keengwe also believes that the other essential characteristics of blended learning are *continuity*, *reasonableness* (it happens by necessity) and *the use of low-cost technologies*. Most researchers claim blended learning is a strategy that adapts to all audiences.

2.1. Blended Learning Models

Horn (2014) classifies blended learning into several basic models. He identifies the following: 1) *rotation model*; 2) *flex model*; 3) *model a la carte*; 4) *enriched virtual model*.

The rotation model includes any course or subject in which students move in rotation on a fixed schedule between educational modes, in which at least one is online, and the rest may include activity in small groups, project groups, large briefings groups, individual tutoring, and tasks. Students mainly study at the brick-and-mortar campus. The teacher of record is represented offline.

Subtypes of rotation model:

- *Station rotation* - the group moves from one station to another during the day;
- *Lab rotation* - computer rotation with online study;
- *Flipped classroom* - a course or subject in which online learning is done outside the place and in a physical place, a *face-to-face meeting and practice* is done;
- *Individual rotation* - rotation occurs between students with their places.

The flex model is about students moving individually, and the schedule of study modes is flexible. Students usually study on-campus, but *online activity is the basis of learning*. *Face-to-face mode and meetings* complement *online training* on an everyday basis. The teacher of record is represented *offline* here.

Model a la carte is a model in which students take the course entirely online, and other experiences complement it on the ground. The teacher of record is represented *online* here. However, only some courses a student takes are online; some are offline, on the ground.

An enriched virtual model intends a course or subject in which face-to-face study occurs periodically in tête-à-tête sessions. The teacher of record is represented *both offline and online* and is often the same teacher. As a rule, such a model appears in schools that first began as completely *full-time online schools* and only developed their *blended programs after a while*.

Savage (Savage, 2018) gives a slightly different classification in comparison to the models proposed by Horn and recommends a choice of the following three models when organising blended learning in a company: 1) *Flipped Model*, 2) the “*Face-to-Face Driver*” Model; 3) *Online Driver Model*, AKA the *Flex Model* or *Enriched Virtual Model*.

The flipped model he considered the most well-known version of blended learning and described further. *The flipped model* swaps the traditional classroom lecture structure in the classroom and potential homework after class. Students get acquainted with content on the Internet before the class starts, and after that, they work face-to-face in the classroom to discuss the content, work through problems, group or project work, or other exercises. This model seems best for those who need more practical study, group work and project work. In this case, the independent part of the training is conducted through convenient resources and content, easily accessible before and after the learning event.

The “Face-to-Face Driver” Model is described as “probably the most common blended learning model in the modern corporate learning space” (Savage, 2018). A significant amount of study time is replaced here by online courses or classes. The energy centre in it is *a teacher or an expert* in the classroom, and preliminary and follow-up activities are carried out online individually. This model is recommended for classes with different professional experiences and competencies. Online classes provide an opportunity for further study and various learning speeds, while instructor-led classes provide students with a more traditional approach to learning.

The Online Driver Model, AKA the Flex Model or the Enriched Virtual Model, is highly versatile and can meet the needs of various formal and non-formal learning processes. Online study is the basis of this model; courses are mainly held online with some necessary offline additions: lectures, project work or laboratory work. A variation of this model may be when students can access course materials online. However, the instructor provides personal

support on a flexible and adaptive basis as needed through activities such as *small group training, group projects* and *individual lessons* rather than scheduled lectures.

2.2. Peculiarities of the blended learning format and its pedagogical challenges

Bigman declared that blended learning is a total malfunction in the status quo of the educational system (Bigman, 2014). It shakes up all the foundations of the educational system not through ideology but through pragmatics: successful decisions regarding the cost of the educational process, proven effectiveness and scalability of programs are the critical advantages. However, he also mentions that blended learning programs and schools still need theoretical support and further development.

Schools and other educational institutions that apply the blended learning format can be built on entirely different pedagogical approaches and content: a report on Blended Learning gives examples of 13 schools with different pedagogical concepts examined as part of a blended learning format study. However, they all undoubtedly have something in common concerning the basis for developing a digital educational environment, educational tools and technologies.

Horn (2015) highlights competency-based learning as one of the main ideas of blended learning formats. The main idea of competency-based learning is that the student must prove mastery of the topic, including demonstrating skills and knowledge, before moving to the next level. Learning through doing is part of this idea.

Thompson and colleagues (2015) suggest that blended learning should increase student engagement. This is achieved through the inclusion of synchronous and asynchronous student learning, increased collaboration, the provision of assessments (to measure effectiveness) and an increase in supporting materials (Thompson *et al.*, 2015).

Victor Kaptelinin and Bonnie A. Nardi (Kaptelinin & Nardi, 2007) explore the interaction between people through technology. Their goal was to “*use theory to stimulate great design — developing digital technologies that take into account the needs and desires of specific people and groups.*” They say that in education, the information transfer model is supplanted by other (more interactive) approaches shaped by the ideas of Lev Vygotsky and that digital educational tools are gaining momentum within this new field.

Lev Vygotsky substantiated the necessity and benefits of collaborative work, non-hierarchical compatibility, and interaction space in education as early as the beginning of the 20th century. Vygotsky significantly impacted a wide range of research in psychology and cognitive sciences (Hutchins, 1995) and education (Lave & Wenger, 1991). With the advent of digital technologies and tools capable of implementing and scaling educational processes, Vygotsky's theories found their application in the new environment; for instance, they were used in the study of computer support for teamwork/learning (Stahl, Koschmann and Suthers, 2006).

Based on theoretical research at that time, we focused on points of a challenge for Blended Learning. We explored them in reports, tutorials and research to prevent possible problems and increase the chances for success. Therefore, the following points were identified as the most common challenging issues during the development and implementation of blended learning programs (Obsidian Learning, 2019):

- **Starting with technology**

The Obsidian Learning handbook warns against deciding to develop a blended learning program influenced by a desire to experiment with a new tool or technology platform. In their opinion, technology should always support learning and not vice versa. The authors of the Institute for Adult Learning Singapore share the same opinion. In their "Blended Classroom with Work and Technology: How to Design a Blended Curriculum", they recommend switching to the choice of technology only at the final design stage of the program.

- **Replacing face-to-face learning with online learning**

Simply replacing regular sessions with eLearning will not work. Blended learning design requires an investment in the analysis with careful consideration of the desired results, the results that make up the program, and the features of the blended learning format.

- **The universal use of the available technology**

Regarding the efficiency of the educational process, there is no crucial need to implement the automatic use of any newly acquired/developed tool for training in all the programs. For example, a newly developed mobile application should only automatically mean that it can be included in some courses. However, all the superior technologies designed to maximize engagement and help students gain knowledge, such as Mobile

Learning, 3D Simulations and VR / AR, must be presented in correspondence with the goals and strategies of learning.

We completed these global challenges by a list of Mswazi Tshabalala and colleagues, who designated the following as serious problems impeding the adoption of blended learning (Tshabalala et al., 2003), as it seemed to be highly relevant for the EnerJew program, based on managers' current evaluation:

- Lack of deployment policy, since it is crucial for the implementation process;
- Lack of support from the side of teachers because it would ensure the practical realisation of the recently introduced approach;
- Lack of technological and computer skills, given that these skills are necessary for the use of blended learning for both students and teachers;
- Large class size as a hindrance to the educational process in blended learning;
- Need for more technological resources - the lack of computers to use restrains the proper practice of blended learning.

Equipped with this theoretical knowledge, we dove into blended learning and focused on designing solutions for current educational activities, project needs, and constraints.

2.3. Educational Theories Aspects: What Did We Rely on?

The pedagogical vision and educational approach of the educators' team were mainly formed and influenced by the ideas of social constructivism and existentialism. Relation to who and what a human and people are is based on some interpretation of traditional Jewish values. Below, I share some principles we followed in the educational project, grouped according to their closeness to the learning theories.

- **Social constructivism**

Many educational beliefs and methods were based on theories of social constructivism. Thus,

- The belief that learning is an inherently social practice, a belief that we learn through social interaction;
- Use a great potential of a language for forming a group culture and development of an individual;

→ Keep in mind the zone of proximal development concept and use it a lot while creating interactions and intersections with a 'more knowledgeable other'.

The ideas of Lev Vygotsky, one of the brightest educational psychologists who formed the roots of social constructivism, were the platform of pedagogical thinking from the beginning. His texts about collaborative practices' need for peer work, interactions in class without a teacher, and the importance of play for an individual's development significantly impacted the project approach.

- **Learning Environment**

Alexey Leontiev, one of the followers of Vygotsky, developed *Activity Theory*, which explains the ultimate reason for any human activity in the world *as an innate need*. A *need* can be explored from a biological and psychological perspective, and having *a need* means that something "*should be present in the environment*." From that perspective, a need has an orientation toward the world to change the environment — manifested through behaviour and subjective experience. Need looks for an object in the external environment or has it initially and embodies itself through it.

- **Existentialism as an Additional Perspective: Emotions, Choices, Meaning**

I believe that existentialism theory gives additional perspectives to education which are extremely important for designing educational projects:

→ The idea of refusing to reduce the human way of being to any particular code or system;

→ The idea of each person's responsibility to themselves and others in the ways that they choose to live and the requirement to act truthfully for ourselves while recognising human frailty and the contingency of any given truth to get the meaning, not just according to social norms;

→ The freedom of choice and the need to choose using our free will. The consequence is that part of the educators' job is creating conditions for choices and, in some way, teaching students to make decisions;

→ The idea that education is to contribute to the realisation of self (Koirala, 2011)

→ The idea that every individual is unique, and education must develop individual differences (Koirala, 2011)

The beneficial role of the teacher, described in the existential pedagogy approach, also seems related to typical educational practices of the EnerJew project, as far as we use many group facilitation skills as teachers:

The teacher has a role in forming the atmosphere governing the class. The teacher presents the students with a proper model for exploiting communication skills through active listening; the teacher welcomes new ideas, so he is also a learner; he helps the learner be independent and responsible by allowing free speech and letting the learner pose open questions and obtain positive and good feelings about his learning experiences. The teacher must be able to create good human and emotional relationships with the students and be honest about his feelings and emotions. He must not impose his will and tendencies on the students. Although we could not expect students to learn many things through this method, the important matter is that they will learn how to learn. (Mahini, Yahyaei, 2017)

According to Jean-Paul Sartre's famous book outlining "*Existentialism is a humanism*," there is no power higher than the man in this world. My values basement is with existentialists. Still, social constructivist theory gave us a lot of practical tools and points of view that we adopted and combined with existentialism positions.

- **Sharing of Knowledge**

We believed that particular attention should be focused on hidden, inbuilt knowledge provided through the conscious design of values transmitted by the forms and methods of learning activities. Examples of that phenomenon are constructing socio-educational norms of some groups through language, attitudes, assessment criteria, practices, use of space, time constraints, visual language, music, the rhythm of learning, and others.

Karl Mannheim (Mannheim, 1997) argues that knowledge is always rooted in a specific "*conjunctive experiential space*." Michael Polanyi (Polanyi, 1978) classified human knowledge into two categories and introduced the term "*tacit knowledge*":

- *Explicit knowledge* – is "know what," the facts and algorithms that can be written down so others can both understand and use the knowledge." *Explicit knowledge can be found in documents*" (Wellman, 2009).
- *Tacit knowledge* has a personal quality, which makes it hard to formalise and communicate. Tacit knowledge is deeply rooted in action, commitment, and

involvement in a specific context. In Polanyi's words, "*indwells*" is a comprehensive cognisance of the human mind and body.

Polanyi also defined *tacit knowledge as a pre-logical phase of knowing*. He described it as '*we can know more than we can tell*. Following Polanyi's definition and ideas (pretty inspiring for me), we can also find some thoughtful content by Hodgkin. He said that "*people use a lot of tacit knowledge bits in an attempt to make sense of something*."

Sharing tacit knowledge is a natural but challenging task at the same time. It appears to be happening constantly but could be more challenging to design by purpose. I found the concept of sharing tacit knowledge, provided by Ikujiro Nonaka, related to our problem and ideas for improvement. Japanese organisational theorist Ikujiro Nonaka delivers a concept of commonplace as a learning approach. He called the concept "*Ba*": in Japanese, it means shared space for emerging relationships. "*Ba*" provides a foundation for advancing individual and collective interchange. This space can be physical, *virtual*, mental (shared experiences, ideas, ideals), or *any combination*. Thus, the environment is a necessary framework that makes possible and visible generating, sharing, and transmitting tacit knowledge between people. Moreover, this, in its turn, leads people to discover more.

So, theoretical research on this stage of the project was fruitful. However, as a result, at that point, it still left us with more defined conceptual questions related to the connection between education and technology:

- What is the unique role of interaction and personal contact in the educational process? What, when, and where can it not be replaced by technical solutions?
- What is the role of the physical dimension/ space/ practice in the educational process nowadays? How do brick-and-mortar formats affect the learning process supported by educational technologies? In what cases and for what results is the presence of several people in one physical place necessary and irreplaceable?
- How can we design sharing knowledge processes with educational technologies? What internal laws govern the construction of such processes and systems, in which cases they are especially in demand? To what can they become an alternative?

3. Research Question

The fundamental focus of this study is to explore the role and potential impact of a) a mix of various educational technologies and b) a dedicated mobile application as a tool for non-formal education in the context of the EnerJew program. The research addresses the ways in which both a combination of tools and a specific mobile application can cater to the unique educational requirements of EnerJew, enhancing communication, reporting, and knowledge sharing within its community. Importantly, this study also looks to identify how such a mobile application can support the meaningfulness of face-to-face interactions while incorporating key educational values such as collaboration, creativity, transparency, and adaptability to the local context.

Primary Research Question:

What potential can a dedicated mobile application have as a tool for non-formal education in the EnerJew program, and how does it compare to temporary educational technology solutions?

This primary research question is further divided into sub-questions, allowing for a more comprehensive exploration of the potential of the mobile application.

Sub-Questions:

1. **Unique Educational Requirements:** What are the unique educational process characteristics and requirements of EnerJew that the mobile application must cater to? This sub-question will explore the specific educational needs and expectations of the EnerJew community and how these can be addressed in a dedicated mobile application.
2. **Communication and Reporting:** How can the mobile application enhance communication and reporting within the EnerJew program, particularly among counselors and coordinators? Here, the study explores how the application can facilitate information exchange, improving overall program coordination and effectiveness.
3. **Supporting Meaningful Interaction:** In what ways can the mobile app emulate and support the meaningfulness of face-to-face interactions while adhering to social constructivist and existentialist principles? This sub-question examines how the

app can preserve the essential humanistic principles of education in a digital environment.

4. **Integration of Key Values:** How can key values such as collaboration, creativity, transparency, group dynamics, and adaptability to the local environment and context be integrated and promoted in the mobile application design? This section investigates the incorporation of EnerJew's foundational values into the app's design and functionality.
5. **Knowledge Sharing:** How can the mobile application foster both explicit and tacit knowledge sharing within the EnerJew community? The study identifies ways for facilitating effective knowledge exchange among members via the app.
6. **Role of Educators:** How can educators shape an online non-formal educational process through the mobile application? This sub-question will look at the role of teachers and facilitators in shaping online educational processes using the app.
7. **Comparison with Temporary Solutions:** Compared to temporary educational technology solutions, how effective, efficient, and adaptable is a dedicated mobile application in meeting the unique needs of the EnerJew program? This final sub-question compares temporary tech solutions and a dedicated mobile application, highlighting their strengths and weaknesses.

The collective exploration of these sub-questions will provide a comprehensive understanding of the potential role and benefits of a dedicated mobile application within the context of the EnerJew program, leading to valuable insights and recommendations for educational technology integration in non-formal educational settings.

4. Methodology

The research methodology applied in this study is Educational Design Research (EDR), a rigorous and systematic approach aimed at creating educational interventions that address practical problems while also leading to the evolution of design principles and theoretical understandings (McKenney & Reeves, 2014). EDR's inherent strength lies in its commitment to iterative, reflective, and evidence-informed design, which bridges the gap between educational research and practice.

The EDR approach outlined by McKenney & Reeves (2014) comprises three interconnected stages: analysis and exploration, design and construction, and evaluation and reflection. These stages are cyclical, allowing for continuous feedback and improvement. Each stage integrates practical work and theoretical research, operationalised through various methods, including observations, semi-structured interviews, app development group meetings and testing group protocols analysis, questionnaires, and app analytics data analysis.

Phase 1. Analysis and Exploration: The problem was identified and explored in this phase. A deficiency in connections among blended learning community members was found to compromise the system for monitoring program quality and the professional development of educators. An intensive needs and context analysis was conducted to comprehensively understand the problem.

An integral part of this research was conducting field research and interviews. Field research was conducted to observe and understand the behaviour and interactions of the community members in their natural environment. This helped to provide valuable insights into how educational activities are carried out, and the challenges and shortcomings in the existing system of managing these activities. The observations were meticulously documented, providing a rich dataset for analysis.

Alongside the field research, interviews were conducted to gather first-hand experiences, opinions, and perspectives. The target group for the interviews were teenagers, the primary users of the intended mobile application. The rationale behind this decision was to ensure that the app is tailored to their needs and preferences effectively, ensuring its successful adoption and utilisation.

The sampling for the interviews was purposive, and participants were selected based on their involvement in the educational activities supported by the EnerJew community. This approach was chosen to ensure the data collected was relevant and directly applicable to the research problem. Each interview was semi-structured, allowing for a balance of predetermined questions for consistency and open-ended questions for exploring new insights. The interviews were transcribed, coded, and analysed to identify key themes and patterns.

Phase 2. Design and Construction: The main focus of this phase was creating a system for online support for educational activities, specifically developing an innovative

mobile application that functions as a learning management system for informal education. The application was designed to be compatible with iOS and Android platforms and aimed at managing community engagement and learning among youth movement members and leaders.

Phase 3. Evaluation and Reflection: This phase focused on evaluating and reflecting upon the intervention's effectiveness through comprehensive testing, updates, and utilization. The application's performance was scrutinised using observation, interviews, surveys, document analysis, and data analytics.

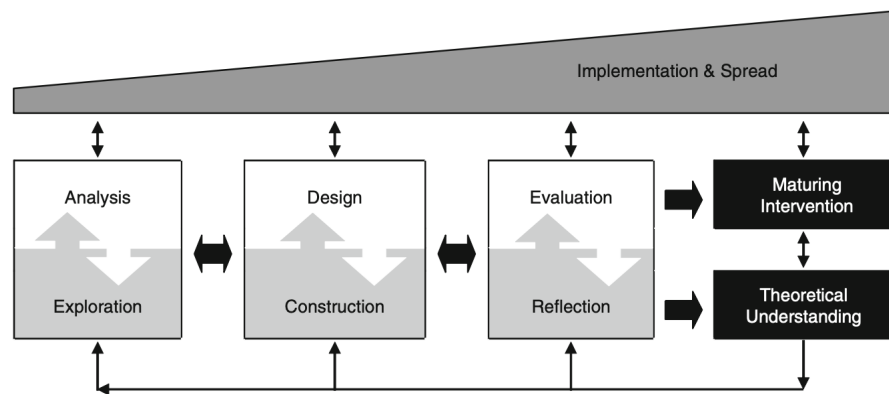


Fig. 1. Generic model for conducting educational design research (McKenney & Reeves, 2012)

The research project spanned a period of 36 months, during which the app was iteratively developed, tested, and refined. To date, more than 2000 unique users are involved in educational activities supported by online tools of EnerJew, indicating the practical impact of the research.

The primary knowledge contribution of this study is an implementation plan for app usage and guidelines on utilising the app effectively.

Through the lens of EDR, this research seeks to answer the central question of how to effectively embody the principles of the EnerJew educational program in designing a dedicated mobile application and how this approach compares to the use of temporary educational technology solutions. This methodology provides a structured approach to problem-solving, enabling a deep understanding of the problem, rigorous development of the intervention, and comprehensive evaluation of the solution.

Key Parameters	Details
Problem	A deficiency in connections among blended learning community members compromised the system for monitoring program quality and the professional development of educators.
Main Focus	Creating a system for online support for education activities and developing an innovative mobile application that functions as a learning management system for informal education.
Intervention Developed	Development, testing, updating, and utilization of digital solutions, suitable for iOS and Android, for managing community engagement and learning among youth movement members and leaders.
Knowledge Created	An implementation plan for app usage and guidelines on utilizing the app effectively.
Research Methods Used	Observation, Interviews, Surveys, Documents Analysis, Data Analytics
Research Scope	The research lasted 36 months with no direct founding
Primary Practical Contribution	To date, more than 2000 unique users are involved in educational activities supported by online tools of EnerJew

Table 1: Overview of Studies Using Educational Design Research Methodology, according to the(McKenney & Reeve pattern (McKenney & Reeves, 2012)

5. Results

5.1. Defining the Challenges during Pandemia

At the onset of the lockdown in March - May 2020, the EnerJew educational system faced several significant challenges related to the impossibility of using the majority of traditional learning formats and the risk of losing the essence of youth movement activities.

At Mart 2020, the main technological tools for supporting EnerJew educational activities were free programs and apps: WhatsApp, Telegram, Instagram and some free Google programs. The project website (www.enerjew.org) was not associated with any educational activities and solely provided a project description for the broader external audience. It was not ready to function as a platform or integration tool for online educational

activities. The information distribution scheme was extensive and confusing at some points, and only a few people could see a whole complex picture. Even managers and program content creators often were unaware of what was being shared on project channels right next to them, the project's priorities, whom the content was targeting, and so on. At the same time, each participant and employee of the project was involved in numerous chats, predominantly, but not exclusively, in Telegram and WhatsApp. Operating all these channels consumed much energy, staff involvement, and system resources.

Together with that, in most cases, communication was intuitively clear for those already involved in the ongoing processes. However, it felt chaotic and unstructured for the new members, such as new participants, student counsellors, parents, and guest speakers, – and about 40% of staff members were replaced every year, according to project statistics from 2016-2020. Moreover, teenagers were expected to come and go even more frequently, as the youth movement's core concept was designed around constantly attracting new members interested in Jewish culture.

While technology was not the main point, these moments felt insignificant; however, after the first month of online operation, already in April, 2020, the aspects and problem names above became critical. To focus on the new challenges a team of educational technologists was formed; their primary task was to interpret the current data and compile the strategy for project survival and growth in the new circumstances. .

After the first stages of analysis the number of difficulties was highlighted by the team:

- Ongoing events' announce, and follow-ups were often mixed with the flow of informational noise, and people got lost and had no structure or tools to find the necessary information;
- The lack of synchronization between different streams, cities and events, dubbing, and other events - since a lot of educational meetings went online and there was no single system with borders, laws, regulations, and procedures;
- Disorientation of new members, adolescents and workers among the channels of information;
- Perceptible losses in the process of transmitting information and its overabundance, causing complaints from the addressees;

- Difficulty in collecting data on the quality of educational programs and, as a result, lack of data analysis;
- Insufficient staff members' support, a collapsed professional support system, quality control, and quality assessment.

So, with the beginning of the lockdown, the educational project, in which technologies played an important but far from the central role, faced fundamental challenges. The responses to these challenges determined whether the project would continue to exist.

The decision was to follow three simultaneous paths:

- a)* exploring the field of opportunities in online education, through a mini-research – interviews with teenagers, involved in EnerJew activities;
- b)* implementing rapid, quick/temporary solutions to improve the situation in a matter of days;
- c)* focusing on long-term strategic development involving the restructuring of the entire system of interaction with educational technologies and their role in the project; this track also included the development of a mobile application that would address multiple project objectives.

5.2. Findings from In-depth Interviews with Teenagers

The initial stage of our research incorporated in-depth interviews with teenagers, focusing on their attitudes towards learning, online communication, and blended learning formats. This mini-study, pivotal in the situation analysis phase, aimed to capture our primary target audience's authentic voices and experiences, hence providing invaluable insights that could shape the design and delivery of our educational intervention. The findings from these candid discussions with the teenagers are presented below, offering a unique perspective into their educational preferences, online engagement habits, and perceptions of blended learning environments.

Perception of the Internet as a Knowledge-Acquisition Medium

Teenagers evaluate their time spent on the internet as significant. On the internet, teenagers play online games, chat with friends, and 'get lost' in social networks. It is interesting to note how teenagers describe their choice of game themes, social media content, and other forms of internet leisure - it often happens spontaneously and randomly while

surfing the web, yet it is also guided and falls within the respondent's zone of interest and desired development.

Nika: I can just get stuck on some YouTubes with TikToks. I can watch videos about admission procedures, about psychology. My engrossments intersect with my interests: if it's TikToks – they're TikToks about theatre, about some psychological tricks, about motivation. Of course, memes, too – but memes on these topics.

Aaron: I select various headlines, edit them. I can create music in programs. I do video editing, and watch instructional videos about programming, about medicine. I just created my first website. But with the help of a programmer, my mentor.

Agniya: During school time, I usually search for something school-related; in my free time – I love music or some series.

Andrei: Everything I do on the internet – I play with friends and chat with the same person. Or sometimes, I watch videos if they are interesting to me. And if I'm looking for some information – I need to find it, to prepare – I do that too.

Hence, this way of spending time represents a form of self-education, driven by free choice and occurring spontaneously in any, even the smallest, interval of time - during breaks, and sometimes even during lessons.

Reliability and Quality of Information

At the same time, it's important for teenagers that the information is verified and trustworthy. Some believe that they have the ability to select it, while others are unsure of this skill. Either way, all respondents recognise that finding correct and useful information on the internet requires effort, application of filtering tools, and in some cases, a guaranteed qualified tip rather than anonymous information.

Nika: You need to be able to filter information and approach everything with scepticism.

Andrei: There's a ton of useful information on the internet and a ton of useless stuff. The main thing is to distinguish one from the other. I select information based on my goal.

Andrei: For example, you can look up how to fix a power socket. In such not-so-safe tasks, it's better to be on the safe side, for instance, consult with a professional if you want to do it yourself - so they can supervise, and explain if needed, rather than simply taking information from the internet.

Diana: I think you can find some reliable sources on the internet, where the information is true, but obviously, not every site will have what you need. It's necessary to carefully select and filter information.

Field of Interest

The majority of respondents noted that they are keen and interested in seeking new information if it is related to a topic they are passionately interested in.

In this respect, spheres of interest can be roughly divided into two parts. On the one hand, teenagers are interested in the field of knowledge associated with the profession they have chosen for themselves in the future. The revelation was that most respondents noted that they are interested in skills related to finding their place and independence in the world - both practical skills and lifehacks, and mindset, thinking, and psychology.

Nika: I'm interested in success.

Interviewer: Success as a result of your activities, as something you aspire to?

Nika: I'm interested in how to stay afloat and stuff like that. How to pursue my goals.

Format of Gaining Knowledge

Two preferred ones can also be identified from the formats of gaining knowledge. On the one hand, processed and structured information proves to be important and valuable. The second format is personal interaction, and live offline communication. This format is more interesting to teenagers because it allows them to feel a part of the team and a part of common interests.

Interviewer: How do you like to learn new things? Is it more interesting to find information independently, or when there are guides, instructions, or educational courses?

Andrei: Guides. It's quite convenient when a person explains everything and shows it clearly. But, if needed, I can also read on my own.

Nika: I feel more comfortable doing it when people around me are also passionate about the topic. When it is presented in some non-standard ways.

Agniya: Probably from personal experience, learning something life-related, through my own example. Or learning something new from people - from people who have more experience, who have been through something. That's the best way. [Online], it seems, everything is the same as in a personal meeting, the information will not disappear. It's just more comfortable when you see the person live and all that.

Some of the respondents are particularly interested in an interactive or personalised format for acquiring skills and information.

Interviewer: How do you search for information and where?

Aaron: [...] sometimes in games, maps. For example, games about medical operations, which have top-level graphics. There you can perform an operation, everything is explained in detail.

Nika: I ask people who have achieved more than I have, what they can advise. And when I'm interested in a specific question, a specific topic - I just google and look for either some websites with text, or videos, or books, if someone recommends somewhere.

Online - Face-to-face Communication: Advantages, Disadvantages, Preferences

The boundaries between online and face-to-face communication among teenagers seem blurred. Friends can be those people you meet and befriend face-to-face, and those you meet in an online game and together experience many adventures and game experiences. The main thing that sets the quality of communication in both areas is called its "brightness", "emotional content", and "liveliness".

Anna: Most of the time, I'm on social media, but it's my communication with friends, and it's not about any tasks, because at school, we're given tasks that need to be done through the internet. Lately, considering how much everything is progressing, my online communication sometimes turns out to be even brighter and more colourful than live communication. Therefore, online and live communication can be the same depending on where you communicate.

Lev: I communicate as I can. If friends can't go somewhere – we calmly communicate online. And otherwise – I'm up for any type of communication.

Interviewer: Does online communication seem real to you?

Mati: Yes, it does. For example, about three years ago, I played a game with a friend - we met more friends there [...we started communicating there, quite often]

Another factor affecting how demanded and "normal" online communication feels is that it a) is a solution where another communication is simply impossible; b) is more convenient for some tasks than face-to-face format.

Agniya: Yes. We communicate with our grandmother and grandfather via Skype, they live in another country. So there's no other option. Of course, it's not the same. Occasionally they come to stay with us. Online -

it's not the same, but it can replace live communication if there is no other way to learn something from them or see them.

***Dmitry:** I can absolutely easily arrange a meeting place with friends or share new information through messengers because it's just convenient. But if we talk about the fact of communication - I think it would be better to communicate live.*

On the other hand, teenagers feel face-to-face formats as more complete and suitable for friendly communication, which can bring a lot of emotions and information about the people involved in them. At the time of the survey (October 2020), in the middle of the pandemic, these formats felt like a luxury and led to a quite conscious definition of their advantages compared to online.

***Aaron:** Of course, it's better to communicate in life. Online communication leads... Personally, I feel more comfortable communicating in life, with people, when a person is nearby, and you can talk to him on any topic. Communication on the internet is inconvenient for me.*

***Andrei:** I read somewhere - I'm not sure if this is reliable information - but that a person gets a lot of information when communicating, not only by listening to words or reading text but also by the movements of another person, for example. This conveys a lot of information - you can get a completely different opinion about a person, although he will say the same thing. And tactile interaction - it's also impossible through the internet.*

***Nika:** In something like Zoom, I just have to sit and communicate, and I get bored. In real life, I don't get bored with that.*

Communication Channels

Out of the possible communication formats, respondents highlight their preferred ones, but there is no general trend — one can assume that everyone chooses communication channels according to their personal preferences and a general generational trend has not been formed.

***Agniya:** I believe, of course, video is better - when you both see and hear a person. It's more pleasant, more comfortable, almost like live. The video format can combine both text and audio.*

***Andrei:** I don't care, in principle. Sometimes I can't, for example, listen to voice messages, sometimes I can. If there's an opportunity to spend time, sit down, if I'm not busy, and have a good conversation - probably, video is better, because with video you get some additional information, besides words [...]*

***Diana:** If I'm communicating with someone I don't know very well — [...] text messages, because there's time to correct something, put punctuation marks, pick synonyms and so on. If this person is really close to me [...] I find it much more convenient to record a voice message or send a video [...]*

***Dmitry:** I use everything, I find everything convenient.*

***Mati:** By text and sound. I communicate with video quite rarely. [...] I don't always want to show my face.*

***Nika:** I can't sit in the voice chat for long, I get bored. In the text, I can step away or simultaneously with the correspondence, I can do my own things.*

To draw a conclusion to the results of the mini-research, the data gained in it, provided rich insights into the ways teenagers perceive and navigate different communication formats in an increasingly digitised world. Their opinions and preferences are informed by a blend of factors, including convenience, the level of personal connection they feel, and the specific context of the interaction.

From a broad perspective, there isn't a universally preferred method of communication among the respondents. Some prefer video for its immersive and almost face-to-face experience, while others lean towards text or voice messages for flexibility and convenience. These preferences hinge significantly on familiarity and closeness with the communication partner.

Interestingly, there are also nuances tied to the format of communication. For instance, video communication, according to some respondents, provides a heightened sense of intimacy by combining both visual and auditory cues. However, text messaging or voice chats allow for simultaneous engagement in other activities, which could be preferable in certain contexts.

This research highlights that digital communication methods, such as those facilitated by mobile apps, can successfully emulate, and sometimes enhance, the richness of face-to-face interactions. Yet, face-to-face communication is still seen as a valuable and irreplaceable experience that provides a higher degree of emotional saturation and holistic understanding of interlocutors.

These findings imply a few key directions in terms of the EnerJew mobile app design. First, the app should offer various communication options, such as text, voice, and visual language, to cater to the varied preferences of its user base. Second, while digital

communication should be facilitated and enhanced, the importance of face-to-face communication should not be neglected. The app might consider incorporating features that encourage or facilitate real-world meetups, blending the digital and physical realms for a holistic social experience.

In conclusion, the communication preferences of the digital-native generation are nuanced and multifaceted, warranting a flexible and adaptive approach to designing digital communication platforms. While the benefits of online communication are acknowledged and utilised, the irreplaceable nature of face-to-face interactions is also recognised, suggesting the need for a balanced and integrated approach in mobile application design. Future iterations of EnerJew's design should thus incorporate these insights to create an engaging, versatile, and intuitive platform that resonates with its users' needs and preferences.

5.3. Quick and Temporary Solutions

After a series of interviews, consultations with operational management, and situation assessments, the following quick solutions were proposed for immediate implementation:

1. Maximize using existing free software and their combinations, and opt for minimal tariffs where necessary.
2. Prepare lesson plans in two formats - face-to-face and online, and rehearse online sessions in advance with those who plan to conduct them.
3. Establish an informal and alternative communication and notification system using teenage chats and personal messages based on the "friend-to-friend" principle.
4. Create a support and professional development system for educators.
5. Develop and launch out-of-region educational programs, focusing on the following fundamental principles:
 - a. Synchronous and asynchronous formats;
 - b. Utilizing various media, formats, and channels: video, audio, text, live broadcasts, tests, games, and others.;
 - c. Programs of varying duration and participation opportunities: one-time, long-term, intensive;
 - d. Experimentation with short iterations, relying on feedback, analytics, and adjustments based on drawn conclusions;

e. Involving both project staff and external guests, speakers, and presenters.

More details about the formats in which these were implemented and interesting aspects related to their implementation will be discussed further below.

- **The transformation from face-to-face to online: Using Zoom for city club meetings and supporting educators**

As mentioned above, the regular club meetings were moved online due to the impossibility of working in offline formats and the uncertainty that exacerbated the problem. Quarantine in different cities was introduced unpredictably, depending on the current epidemiological situation, and it was impossible to predict what the situation would be like in a week. Table 3 shows the number and ratio of educational sessions held in various formats in cities from March to May 2020.

As can be seen, the majority of meetings took place online. Interestingly, the availability of offline meetings in different cities varied, with each city having its level of engagement in online formats. Despite the chaotic and unpredictable nature of the situation, some trends emerged. For instance, cities like Vitebsk, Saratov, and Kazan faced significant challenges with online formats and barely operated online. Conversely, other cities halted online meetings when the weather warmed up (in late May), opting for outdoor gatherings in city parks or suburban areas. The uncertainty surrounding the format of club meetings called for changes in overall program support for leaders and managers. It was unclearer what to prepare for, which programs to develop and propose, when and for whom, as there was a significant lack of competencies for online work across the system, both technologically and in terms of vision.

Thus, to address the issues, an online lesson development and support group was formed, with designated roles for online methodology specialists. Their task was quickly researching and suggesting tools suitable for adapting various lessons to an online format, integrating them into the lessons, and creating tutorials for first-time users. The group operated at total capacity during the entire period from March to May 2023 and included leaders from several departments.

In addition, weekly meetings were held in an open forum format, dedicated to reflection and enrichment in online learning. The forum was open to anyone interested, not just those working within EnerJew, and it provided a platform for discussing challenges,

discoveries, and questions related to online learning and exchanging experiences and knowledge among various educators. A total of 9 such meetings were organized between March and May 2020.

- **Inventing and Implementing New Online Formats: The Experience of Informal Online Education**

Unlike the online clubs with their planned but unfeasible offline programs, the task here was different: creating both programs and formats was necessary, and the relationship between the two was reciprocal. It was not about adapting the program to an online format but creating a new educational product from scratch. The task was difficult, but despite its complexity, we believed it was essential to invest in its solution. The following considerations guided us:

First, it needed to be clarified how professional the city club coordinators would be online, and global formats provided the opportunity to invite guests and speakers regardless of their location, thus improving the quality and level of participant engagement.

Second, in a regular mode, besides the weekly city club meetings, camps and seminars were held once or twice a year, gathering representatives from different cities - these gatherings generated significant interest, new acquaintances, knowledge pushes, and a desire to continue communication. Under quarantine conditions, it became impossible to hold such camps, so it was necessary to offer an alternative.

Furthermore, finally, we were intrigued by online prospects, as we were interested in exploring the potential of online platforms and attracting new participants.

This mix of concerns, dreams, and expectations led us to create the following formats:

- Youtube blog (<https://www.youtube.com/@ENERJEW>)
- Audio Podcast (<https://soundcloud.com/digitalmatsa>)
- Instagram live (<https://www.instagram.com/enerjewproject/>)
- Telegram channel and chat
- Zoom webinars (with recording) and their youtube posting (<https://www.youtube.com/@ENERJEW/playlists>)
- Zoom online intellectual games
- Online courses
- Minecraft online community sessions

→ WhatsApp and Telegram technical support

Working groups were established among project staff, responsible for developing and implementing each of the above-mentioned formats. To enhance the effectiveness of these developments, counsellors and active teenage participants in city clubs were invited to join these groups. Below are a few highlights related to the formats.

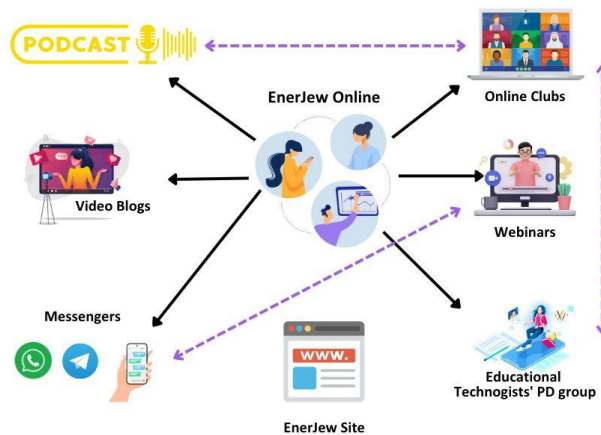


Fig. 1. Use of communication channels for spreading information in March 2020

The *most engaging* in terms of collaboration and joint creation were:

a) *Webinar* tracks - the share format featuring speakers that included both invited professional guests and participants, as well as workers from within the project. This format attracted much attention and proved attractive to many;

b) *Minecraft* gaming - a group of teenagers were responsible for the development. Under supervision, they formed the game tasks, necessary technical conditions (server), the story, and technical support, and also organized advertising and recruitment of other kids to participate.

The combination of Zoom and YouTube proved quite successful and was the *most commonly used* approach from March to June 2020. The number of views for Zoom recordings published on YouTube was comparable to the number of Zoom webinar participants and often exceeded them (Table 214234). However, this was not the case from the very beginning, and it became a reality only after thorough organization and attention to the following details:

1. Prompt publication within a few hours after the end of the Zoom webinar. We attribute this to riding the wave of information - while memories of announcements and intentions to participate were still fresh.
2. Pre-registration of those interested in the webinar, followed by sending the published video to them as soon as it was available, along with an invitation to watch.
3. Minimal editing of the saved Zoom video to make it more appealing and exciting for viewing.
4. Attractive presentation on YouTube: a designer-created cover, the formation of thematic playlists, descriptions and hashtags, and the publication of video announcements.

The *audio podcast*, hosted on *Soundcloud.com* and automatically broadcasted on several podcast platforms, became an experimental and successful case of a *completely new format*. During the early months of the pandemic, when the time spent in front of screens significantly increased for the teenage audience, the audio format, which did not require constant screen attention, appealed to both teenagers and adult listeners. We received numerous feedback on both the episodes' content and the format itself, supporting these conclusions.

5.4. How to Break Through Info Noise? Solutions for Information Channels in Informal Education

The primary strategy at this stage was to achieve the broadest possible coverage, so the project utilized every available channel for disseminating information. However, a few weeks after organizing the project's online operations, we encountered an extremely high level of *information noise* and the associated difficulty in delivering messages, announcements, and receiving feedback. At a time when face-to-face interactions became impossible, the online environment became much more saturated with messages, information, announcements, and calls to participate – and in this stream, conventional methods of delivering information and announcements stopped working.

On the other hand, the added fatigue from constant contact with technology in all areas of life exacerbated the problematic situation. A reversal took place in the lives of

teenagers: phones and computers, messengers, and social networks, which previously served as entertainment and accompanied leisure and distraction from serious topics, was subject to an expansion by formal institutions and various educational formats. This confusing process caused rejection and a desire to distance oneself from technology among many teenagers: they now want to spend their free time away from computers and phones. Everything related to technology, at some point, became associated with school and studying. So, this was defined as a significant problem, and we searched for a solution for a long time, considering different options and changing approaches at various periods.

The first step taken was to systematize informal contacts and achieve maximum reach. We identified representatives in all teenage chat groups within city clubs and agreed with them to systematically share information within these groups on their behalf. This approach aimed to make invitations as personal as possible and distance them from the formal tone associated with school settings.

Simultaneously, we created a Telegram channel and chat group, inviting everyone who had attended any online project event at least once. This platform was used to post announcements, invitations, recordings of past webinars, polls, memes, and interesting facts.

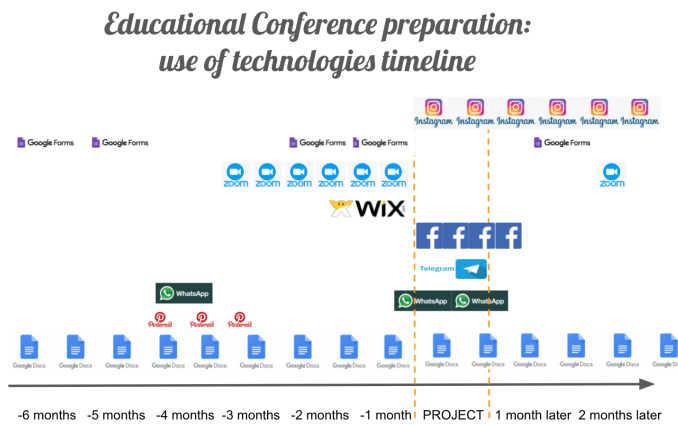
We utilized a short registration form for each online event that collected participants' contact information and asked them to specify their preferred messenger for receiving event reminders. *Fifteen minutes before each event,* the organizer manually sent out reminders and links. *Fifteen minutes after each event,* a link to a feedback form or a simple question from the organizer was sent, asking: "How was it? Was it interesting? Any comments? What caught your attention?" These brief exchanges aimed to establish a more informal connection, differentiating the interactions from typical school formats.

In addition, *we paid great attention to design and visual language to move away from the typical "invitation to a Zoom session" format* associated with school activities during that period. Over time, a distinctive design for the online educational program emerged:

- A landing page on *Tilda.com* was linked to the main project webpage, enerjew.org, for announcing and quickly updating relevant information;
- *Instagram posts* and sharing information with a link to the Tilda page in local club WhatsApp groups were used for promoting activities;
- Online activities were conducted via the *paid version of Zoom*;

- *Feedback* during the sessions was collected through *built-in Zoom polls* or *Telegram chats*;
- *Detailed feedback* after the session was provided via *Google Forms*;
- *Official reports* also had to be submitted through the *SalesForce system*;
- Other tools, such as *Kahoot*, *Miro*, *YouTube*, *SoundCloud*, *Canva*, and *Padlet*, were used during the online Zoom sessions.

Fig.2. Timeline of using technological tools for a typical educational program in Enerjew in March 2020.



Furthermore, almost every session intentionally incorporated interactive tools of informal education, such as *polls*, *interactive boards*, *quizzes*, and *prize giveaways*, which were later mailed to the winners. These short-term initiatives aimed to alleviate immediate challenges while laying the groundwork for more comprehensive and strategic changes shaping the project's future direction.

5.5. Mobile App Development

At the same time, the most exciting and significant point became thinking about strategic solutions to answer the project's needs in the longer term. Consequently, we considered the development of a mobile app that would allow us to sustain close ties with EnerJew participants without getting overwhelmed by the plethora of online platforms. Such an app, which could consolidate or supplant the many communication channels and reporting mechanisms the project was using at the time, would benefit both counsellors and managers.

To realize this vision, we formed a working group in April 2020 comprised of education managers and app developers. I had the opportunity to contribute to the app's development as an educational technologist with expertise in managing online and blended education programs. The working group convened weekly, collectively shaping the app's vision and architecture. The following sections provide insights into this process's critical junctures and fascinating aspects.

The path forward was not entirely clear at the outset - the inaugural meeting between technologists and educators did not yield a concrete plan for the app's design. No one held the definitive answers. Much of the work involved cultivating a shared language, bridging gaps in understanding, clarifying tasks, and defining the application we needed. This process was illuminating and instructive - we leaned into the project's unique spirit to identify the app's key features to support and enhance. Naturally, these expectations raised questions - could the app truly fulfil all our requirements in the field? There were also numerous questions about the technology involved. Some of these are outlined below.

- How can I make each meeting with participants meaningful, whether online or face-to-face?
- What do learners need, and what are they looking for in online educational formats?
- What content is worth learning and teaching today with the help of educational technologies in the Jewish heritage field?
- Content or skills should be taught mostly through technological tools. Or both?
- What is the role of an educator in an online non-formal educational process?
- What should the results be? How should we measure them?
- How can we evaluate the effectiveness of our work?
- What should be the relations between our online educational projects and EnerJew face-to-face activities and the world around them?
- What should the relations be between EnerJew online educational projects and other online activities/contexts?
- How do we share values among team members and prepare them to use them?
- How do we share knowledge and data gained with the help of educational technologies?

→ What is the common "DNA" of all the educational projects we designed and implemented online and face-to-face? What are the key points/values/terms/positions?

Of course, we all came up with some practical answers to some of the questions above. However, questions came back time after time. They had to be redefined according to changes happening in the world: technologies, desired content and skills, and the very language of interaction between people, as it had to make sense and touch the language of the generation. The core question, however, was usual for any other educational project: *How meaningful learning experience can/has to be created? In this case – with the help of educational technology?*

Basic Principles for Mobile App Construction

We decided to work on these questions based on the primary educational system characteristics and values we wanted to keep and cultivate online. Thus, we define the *basic requirements for the App Design related to the desired educational process characteristics*:

- High level of collaboration and interaction;
- Creativity and curiosity as the motivation key for all system actors;
- Transparency, meaningfulness and common sense, applying to all system requirements and interactions;
- Paying attention to the group process and dynamics, relation to the Jewish calendar and actuality;
- Flexibility towards local environment and context;
- The simplicity of operations.

A more detailed description of what we meant by this is provided below.

Collaboration and interaction

Meaningful interaction and collaboration on every level of the educational process are the base: of getting and understanding information, commenting and questioning, applying, matching expectations and purposes, reflecting, and giving and getting feedback.

Collaboration is a necessary component of the learning process in EnerJew, and knowledge appropriation in learning groups and outside them, with teachers and colleagues, structured, semi-structured, and unstructured interaction. Diversity of views, positions, and identities in the process can make facilitating it more profound, fruitful, and complicated.

Creativity and Curiosity

The learning process should be creative and bring valuable and tangible results. The ability and need to generate new ideas, comments, deeper understanding, or even artistic works as results should be an inbuilt part of the methodology of every learning session. That creative process enriches individuals and the group and sometimes brings interesting refreshes to the learning content field. Together with it, the tension inherent in facing creative challenges has tremendous educational potential. The need to stand against and solve the dilemma significantly impacts cognitive and social development. Besides, such solutions are anchors and stairs on the path of growth and learning – they help an individual not to slide back down the gentle slope but to cling, root, and get deeper into the essence of the subject being studied.

Transparency and Meaningfulness

Creating a sense of meaningful educational experience, together with participants, in the learning process is one of the most challenging tasks for an educator. The tools that could help to achieve the result are awareness about feelings and emotions; legitimation of common sense questions; readiness for transparency, sharing, open discussion; reflections and feedback; and ongoing principles of conversation. Using these on each level of an education system: while working with managers, coordinators, teachers, and students.

Relation to the Group Process and Dynamics

Working in groups is one of the main formats of the learning process. A group is a helpful tool for organizing many learning processes with the most outstanding efficiency. Still, it is also a unique instrument to provide norms and values, form a supportive environment, and get deeper into the content. Knowing and using the internal rules of group dynamics, shaping group culture, language, and norms, and taking into account the phases of group development is a “magical” tool for the effective implementation of learning.

Relation to the Environment and the Context

The importance of being related and linked to the possible learning and supportive resources outside of concrete learning modules can be designed at two levels:

- Creating a supportive environment for the learning modules: additional learning spaces and “buffer zones” with different levels of involvement and

obligations, giving the possibility of zooming in and out, getting time out and pauses, support, and additional content;

→ Creating supportive connections with the world outside the learning modules: taking into curriculum actual hot themes, designing links to partners and other educational institutions, and working on projects and tasks relevant to the real world.

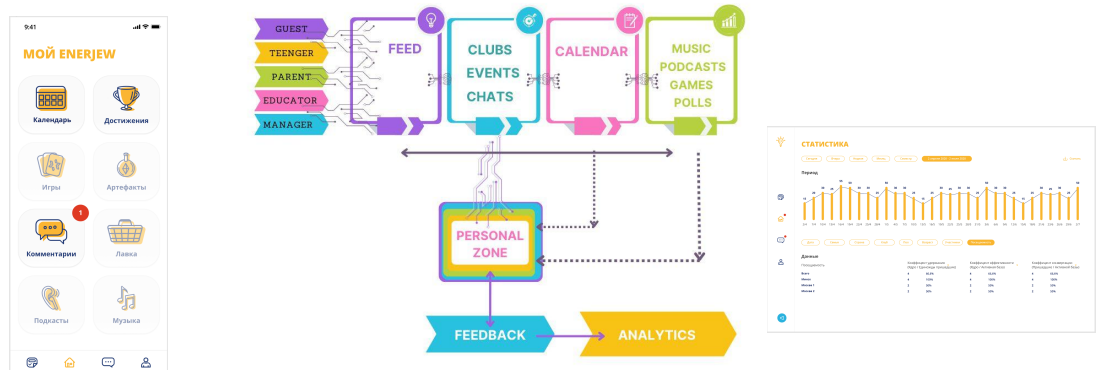
Mobile App Design and Structure

Based on the educational process *qualities* mentioned above, the main **requirements** for the Mobile App needed were formed. Here they are:

- The Mobile App has to be **simple and user-friendly**: ease of use, familiar interface and intuitive laws of operation;
- It has to have **multi-level roles**, but the App architecture has to have **self-similarity**;
- The **communication between participants and educators** is an essential part of the App use;
- It has to have a strong **built-in feedback system** for information circulation and data analysis;
- It has to have **built-in evaluation and success criteria** that serve as guidelines for educational activities, participants and educators.

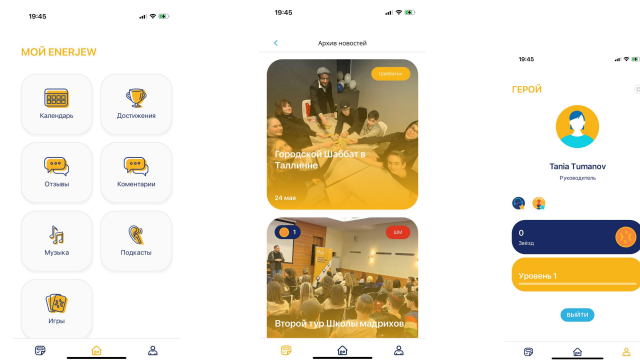
According to the requirement described above, the four main parts of the App were planned:

Fig.3. App Design: the main blocks and connection between them.



1. **The information block** is the collected **flow of information/ feed** conveyed to the participants. *Podcasts, videos, descriptions of upcoming classes, project news, articles, games and public events, music, tests, and games* are included in this module.

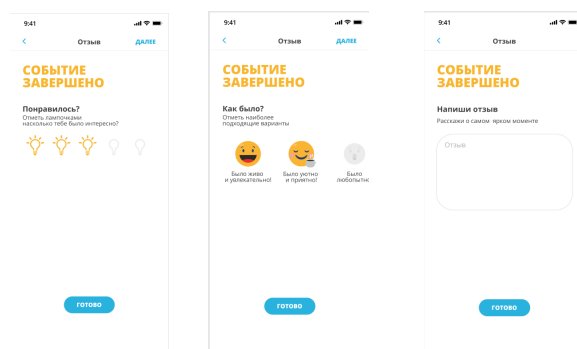
Fig.4. EnerJew Family App Screenshot, information feed block & personal page block.



2. **Personalization block** - an opportunity for a participant to design and follow his/her route and *calendar of events*, save it for himself and follow it, *earn points* and manage them, and choose which offline and online events to participate in.

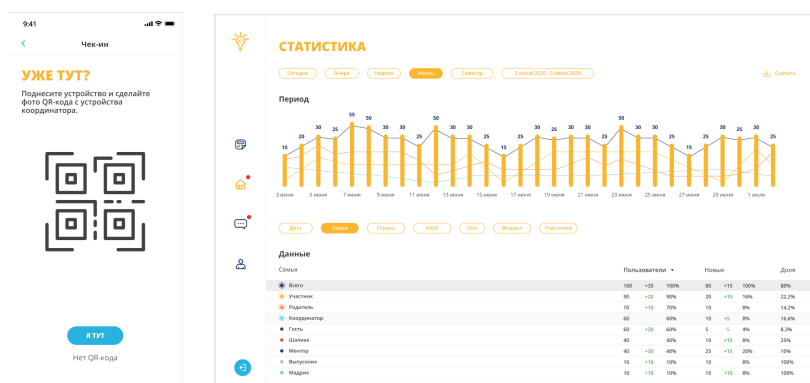
3. **Feedback block**, which consists of two modules:
 - i. Quick response chats (technical support and "ask the rabbi" chat);
 - ii. The check-in system for the activities;
 - iii. The feedback, reviews and comments system.

Fig.5. EnerJew Family App Screenshot, personal page block



4. **Program monitoring and data analysis block**, available only for administration and managers, helps collect, visualize and share information about attendance, feedback, and evaluation of club programs.

Fig.6. EnerJew Family App Screenshot, personal page block.



Looking at the overall structure of the EnerJew app, a significant part of it functioned as an integrator, collecting and presenting various materials in a user-friendly format, all of which were already developed and active on other EnerJew platforms. In other words, the task for this part of the App was to select and structure materials, plan the user journey and create a motivation and gamification system. This meant that the primary task was directly related to digital instructional design.

On the other hand, another part of the application was fundamentally new, and a significant amount of time was dedicated to its development. This part focused on interactive

engagement with the user community, collecting feedback and responses. The dual nature of the App's design demonstrates a commitment to leveraging existing resources effectively and innovating to meet its users' changing needs and expectations. By blending these two approaches, the EnerJew app offers a uniquely flexible and adaptable digital platform that can continue to grow and evolve with the community it serves.

Highlights on Mobile App Design and Functions: Interaction and Innovation

A significant highlight of the EnerJew application is its interactive features that help create a dynamic online community. The review and comment system is central to these, allowing for varied feedback and evaluation levels. The system is designed to give voice to different stakeholders in the project, from participants to educators and coordinators.

The *participant's feedback* is based on several key parameters:

- The overall state of the session
- The dynamic or pace of the session
- Commentary on the session
- The energy level experienced during the session

The *educators and coordinators*, who hold pivotal roles in the functioning of the project, provide feedback on the following:

- The overall energy and mood of the group
- The dynamics and quality of the process
- The content being delivered
- Comments or notes in the free form regarding any aspect of the session or project

Moreover, personalized feedback from participants is collected focusing on the following:

- Their presence or absence in a session
- Individual features or specific behaviours observed during the session
- Personal remarks about the participant for future reference
- Comments or messages for parents, if applicable

While the supervisory staff and directors do not provide ratings, they can monitor all comments, giving them invaluable insights into the experiences of both participants and staff.

The EnerJew application also incorporates a feedback chat feature that further aids communication within the project. This feature allows for immediate technical support in case of any difficulties. It also provides a direct chat option for participants to ask questions about a topic or report an issue in their club.

One of the defining features of the application is its analytics capability. By tracking usage patterns, participant engagement, and feedback, the application provides invaluable data that can guide the future development of the EnerJew project. This analytics aid in understanding what works well, what needs improvement, and how the project can best evolve to meet the needs of its participants.

This blend of features showcases the application's commitment to fostering interaction, encouraging feedback, and continuously improving its offerings. These components also highlight the app's capacity to evolve and adapt based on user input, shaping the project's real-time direction. This commitment to user-centred development represents the heart of the EnerJew project's ethos.

The App can be downloaded here:

for iOS - <https://apps.apple.com/us/app/enerjew-family/id1542400613>

for Android - <https://apkcombo.com/enerjew-family/com.enerjew.family>

6. Discussions and Conclusions

As we now navigate our return to a blended learning format, the impact of the evolutionary strides taken during the pandemic is coming to light. The temporary solutions and mobile app innovations that served us so well in the depths of the crisis are showing their lasting worth, continually assisting in our response to changing circumstances. The resilience and adaptability demonstrated by the EnerJew project throughout these trying times underscores the potential for even further growth and transformation as we move forward.

The impact of the pandemic was not simply a matter of survival; it became a catalyst for innovation and adaptability that has left an indelible mark on our methods and processes. As we re-integrate traditional learning formats, the insights, skills, and tools honed during the pandemic are seamlessly blending with our established methodologies, creating an enriched and more dynamic learning environment. We find ourselves not just returning to a sense of

normalcy, but progressing towards an enhanced version of what we were pre-pandemic, with improved user engagement, optimized use of educational technology, and a more robust communication and feedback system.

In essence, we're seeing the value of the adaptations made during the pandemic extend far beyond the crisis itself, influencing our strategies as we step into a new phase of blended learning. The journey we have taken is proving to be a solid foundation for the challenges and opportunities that lie ahead, underscoring our capacity for growth, transformation, and continuous enhancement in the realm of informal education.

As the pandemic continued, online engagement within the EnerJew project persisted and evolved. Permanent live streams on Instagram became a fixture, and online games emerged as a steadfast pillar in the project's activity. Over time, operating in the online format via Zoom became the norm. This was especially true for the Ukraine region, which was in war and dispersion following the pandemic. In these challenging conditions, online formats continued to operate according to familiar patterns.

During this transition, new and exciting formats appeared, such as online quests, interactive YouTube films, creative blog formats, and more. Interestingly, these were developed directly by the participants themselves. The number of available webinars gradually decreased as the project returned to its familiar patterns and roles - with the notable difference that many activities were now conducted online.

Throughout the pandemic, attitudes towards online formats among workers and participants underwent a significant shift. What once seemed difficult became routine. Arguments that online methods were ineffective faded, and attendance at online sessions increased. The counsellor training school operates online, and as of the current moment, online components are integrated into every subdivision and educational track of the project.

Innovative tools like a Telegram bot for collecting statistics and feedback and sending newsletters have been introduced. Based on temporary and quick solutions, these developments have proven their effectiveness and flexibility of adjustments.

6.1. Evolution of Temporary Solutions and Mobile App Over Time

Temporary solutions proved effective during the pandemic, enabling the EnerJew project to react swiftly and flexibly to changes. New formats, like a telegraph bot application, emerged for email distribution, report collection, photos, and feedback. Meanwhile, the EnerJew app experienced its highs and lows, with significant user inflow and outflow, especially when bugs were discovered. Despite a damaged reputation due to data losses and functionality issues, it primarily serves as an information transmission tool, though stable communication within the project remains unresolved.

The primary question surrounding technology currently relates to the complexity of the information transmission system, reporting, and feedback collection. This situation was exacerbated by the project's recent division into regions (Russia, Ukraine, and Other Countries), leading to information often being simultaneously conveyed through multiple overlapping channels, causing team dissatisfaction. Resolving this issue by choosing a primary communication channel, whether a refined app or another method, is an immediate task.

In retrospect, the most fruitful element contributing to EnerJew's reorganization and adaptation to new realities was the process of developing and finding solutions itself. Key facilitating factors included:

- The establishment and operation of a dedicated group developing Educational Technologies solutions for the entire project.
- The creation of a mixed group of educators and programmers tasked with developing the EnerJew application; one side-effect was identifying areas of development quickly implemented through temporary solutions.
- Emphasizing feedback systems, diversifying their development, and making feedback a norm in everyday work.
- Utilizing informal communication channels, like 'friend-to-friend' formats, for organizing online events.
- Studying teenager interests and habits in online educational formats through interviews provided enlightening insights and ideas.

In conclusion, the pandemic proved to be a fruitful and interesting period for the project, prompting significant growth and transformation. Looking ahead, there are still challenges to be addressed and questions to be answered. The journey so far has set the foundation for the future growth of the project. The insights gained will drive further development, with the priority being to streamline the information transmission system and refine the feedback mechanism. The continual adaptation and the resilience shown by EnerJew throughout the pandemic affirm its potential to thrive even in the face of uncertainty. As we embrace the lessons learned, we also look forward to fostering innovation, improving user engagement, and optimizing the use of educational technology in the project. The road ahead, although not without its obstacles, promises continued growth, transformation, and enhanced impact in the realm of informal education.

6.2. Personal Reflection

As I look back upon the journey I have embarked on while working on this Master's thesis, a few unique insights related to the use of educational technologies and their alignment with my vision come to the fore.

First, a significant outcome of this journey for me is the cultivated ability to evaluate educational technologies critically. I harbour a strong interest in technology; however, my enthusiasm does not extend to embracing every new tech tool that surfaces just for its sheer novelty. Instead, my approach to using any educational tech tool is grounded in the principle of meaningful learning: a) does the tool help foster a meaningful learning environment? and b) what are the best tools and the optimal method of using them to create such an environment? This critical stance towards educational technology use has been further honed by my experiences in the project discussed in this thesis.

Another aspect that has caught my attention is the potential of online collaborative learning practices. Despite the limitations of the digital format, the advantages it offers, compared to traditional offline collaborative methods, are immense. The potential and distinct characteristics, benefits, and constraints of online collaboration, enabled by diverse media and technologies, warrant further exploration. My experience with the project in this thesis has acquainted me with a range of collaborative tools, such as ones facilitating

co-creation through programming, video editing, graphics, and music. I foresee their number and quality escalating, given their educational potential.

One of the fascinating aspects of online collaboration, as experienced during my project, is the provision for rapid feedback, a crucial factor driving further progress and the refinement of tools as needed. Add to it the enriched language of communication facilitated by instant and open access to varied types of information, visual and audio language, gamification, and hyperlinks, and you have a vibrant, collaborative environment conducive to learning and growth.

My reflections on collaborations have spurred an interest in blended learning and encouraged me to research in this area. The Flipped Model, which is a well-known exemplar, resonated with my vision, as it keeps collaborative practices offline while taking information acquisition online. I intend to explore more models and research in this field that align with my values and vision.

Lastly, a critical area of interest for me in educational technology, particularly in light of my project experience, is networking and creating a learning environment for educators. The boundless potential of technology to scale up projects, employ a fractal approach at different communication levels, and cultivate communities of pedagogical practice is truly exciting. I'm already tapping into these opportunities and look forward to refining my practical vision and skills.

7. Author's Declaration

I hereby declare that I have written this thesis independently and that all contributions of other authors and supporters have been referenced. The thesis has been written in accordance with the requirements for graduation theses of the Institute of Education of the University of Tartu and is in compliance with good academic practices.

Tumanov Tatiana
02/06/2023

A handwritten signature in black ink, appearing to be 'Tatiana Tumanov', written in a cursive style.

8. Bibliography

Bartolic-Zlomislic, S. and Bates, T. (1999) *Investing in Online Learning: Potential Benefits and Limitations*. Available at: <http://det.cstudies.ubc.ca/detsite/researchproj.htm> (Accessed: 1 February 2020).

Bell, L., van Waveren, C. C. and Steyn, H. (2016) 'KNOWLEDGE-SHARING WITHIN THE PROJECT-BASED ORGANIZATION: A KNOWLEDGE-PULL FRAMEWORK', *South African Journal of Industrial Engineering*. The Southern African Institute for Industrial Engineering, 27(4), pp. 18–33. doi: 10.7166/27-4-1580.

Bigman, M. (2014) *An Algorithm for Reform: The Potential Impact of Blended Learning on American Education*. Available at: https://wescholar.wesleyan.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&https_redir=1&article=2203&context=etd_hon_theses (Accessed: 6 February 2020).

Billett, S. (1996) *Situated Learning: Bridging Sociocultural and Cognitive Theorising, Learning and Instruction*,. Available at: <https://eric.ed.gov/?id=EJ535117> (Accessed: 1 February 2020)

Boh, W. F. (2007) 'Mechanisms for sharing knowledge in project-based organizations', *Information and Organization*, 17(1), pp. 27–58. doi: 10.1016/j.infoandorg.2006.10.001.

Brindley, J. E., Walti, C. and Blaschke, L. M. (2009) 'Creating effective collaborative learning groups in an online environment', *International Review of Research in Open and Distance Learning*. doi: 10.19173/irrodl.v10i3.675.

Collins, H. (2004) 'Interactional expertise as a third kind of knowledge', *Phenomenology and the Cognitive Sciences*. doi:10.1023/B:PHEN.0000040824.89221.1a.

Cornford J., P. N. (2003) *Putting the University Online : Information, Technology and Organizational Change*. Available at: https://www.researchgate.net/publication/31733980_Putting_the_University_Online_Information_Technology_and_Organizational_Change_J_Cornford_N_Pollock (Accessed: 1 February 2020).

Cuban, L. (2004) 'The Open Classroom: Were Schools Without Walls Just Another Fad?', *Education Next*.

Field, J. (2006) *Lifelong learning and the new educational order*. Trentham Books.

Available at:

https://books.google.ru/books/about/Lifelong_Learning_and_the_New_Educationa.html?id=1XLSgYUzwoAC&redir_esc=y (Accessed: 2 February 2020).

Furnell, S. M. *et al.* (1998) *A generic reference model for online distance learning*.

Available at: http://www.mit.jyu.fi/ope/kurssit/TIES462/Materiaalit/Furnell_ym.pdf

(Accessed: 1 February 2020).

Heydenrych, J. F. and Prinsloo, P. (2010) 'Articles Revisiting the five generations of distance education: Quo vadis?', *Progressio*.

Horn, M., B. (2014) 'Models of blended learning', *Blended: Using Disruptive Innovation to Improve Schools*.

Horn, M., B. (2015) 'What is blended learning', in *Blended: Using disruptive innovation to improve schools*. doi: 10.3109/09286586.2011.602507.

Horn, M. B., Staker, H., & Christensen, C. M. (2017). *Blended: using disruptive innovation to improve schools*. San Francisco, CA: Jossey-Bass.

Hung, D. W. L., & Chen, D.-T. (2001). Situated Cognition, Vygotskian Thought and Learning from the Communities of Practice Perspective: Implications for the Design of Web-Based E-Learning. *Educational Media International*, 38(1), 3–12. doi:

10.1080/09523980121818

Huss, John A. (2007) "Using Constructivist Teaching to Shift the Paradigm for Pre-Service Philosophy of Education Statements," *Essays in Education: Vol. 21 , Article 7*.

Available at: <https://openriver.winona.edu/eie/vol21/iss1/7>

Kaptelinin, V. and Nardi, B. (2007) 'Acting with technology: Activity theory and interaction design', *First Monday*, 12(4). doi: 10.5210/fm.v12i4.1772.

Karacapilidis, N. (2010) *Novel developments in web-based learning technologies : tools for modern teaching*. Information Science Reference. Available at:

[https://books.google.ru/books?id=Te_CO0vsn64C&dq=\(Jackson+%26+Anagnostopoulou,+2001\)&source=gbs_navlinks_s](https://books.google.ru/books?id=Te_CO0vsn64C&dq=(Jackson+%26+Anagnostopoulou,+2001)&source=gbs_navlinks_s) (Accessed: 1 February 2020).

Keefe, T. (2003) 'Enhancing a Face-to-Face Course with Online Lectures: Instructional and Pedagogical Issues.' For full text:

<http://www.mtsu.edu/~itconf/proceed03/109.html/>. Available at:

<https://eric.ed.gov/?id=ED479241> (Accessed: 1 February 2020).

Keengwe, J. (2018) *Handbook of Research on Blended Learning Pedagogies and Professional Development in Higher Education*. IGI Global.

Kilby, T. (2001) *The direction of Web-based training: a practitioner's view*. Available at: <http://www.emerald-library.com/ft> (Accessed: 1 February 2020).

Koirala, M. P. (2011). Existentialism in Education. *Academic voices: a multidisciplinary journal*, 1(1): 39 – 44.

Yahyaee, D., & Mahini, F. (2017). The Influence of existentialism on teaching methods. *International Journal of Learning and Teaching*, 9(3), 354–363. doi: 10.18844/ijlt.v9i3.600

McKenney, S., & Reeves, T. C. (2012). *Conducting Educational Design Research*. New York: Routledge.

Magrini, J. (2012). Existentialism, phenomenology, and education. *Philosophy scholarship*, 30. Retrieved from:

<http://dc.cod.edu/cgi/viewcontent.cgi?article=1031&context=philosophypub>

Mahini, F. & Yahyaee, D. (2017). The Influence of existentialism on teaching methods. *International Journal of Learning and Teaching*, 9(3): 354-363.

Lave, J. and Wenger, E. (1991) *Situated learning : legitimate peripheral participation*. Cambridge University Press. Available at: https://books.google.ru/books/about/Situated_Learning.html?id=CAVIOrW3vYAC&redir_esc=y (Accessed: 1 February 2020).

Leontyev (1978) *Activity, Consciousness, and Personality*. Prentice-Hall.

Littleton, D. and Rethlefsen, M. (2008) 'Library Learning Space—Empirical Research and Perspective', *Medical Reference Services Quarterly*, 27(3), pp. 313–321. doi: 10.1080/02763860802198945.365. *Milhauz Institute of Education, Art and Identity* (2015). Available at: <https://www.milhauz.co.il/> (Accessed: 5 February 2020).

Murphy, R., Snow, E., Mislevy, J., Gallagher, L., Krumm, A., Wei, X. (2014) *Blended Learning Report IN PARTNERSHIP WITH*. Available at: <https://www.edweek.org/media/msdf-blended-learning-report-may-2014.pdf> (Accessed: 1 February 2020).

Na, S. (2015) *Knowledge management: An exploration of knowledge sharing within*

project-based organisations Seunguk Na School of Mechanical, Aerospace and Civil Engineering. Available at:

<https://www.escholar.manchester.ac.uk/api/datastream?publicationPid=uk-ac-man-scw:272930&datastreamId=FULL-TEXT.PDF> (Accessed: 1 February 2020).

Newton, D., Hase, S. and Ellis, A. (2002) 'Effective implementation of online learning: A case study of the Queensland mining industry', *Journal of Workplace Learning*. doi: 10.1108/13665620210427285.

Nonaka, I. and Konno, N. (1998) 'The Concept of "Ba": Building a Foundation for Knowledge Creation', *California Management Review*. SAGE PublicationsSage CA: Los Angeles, CA, 40(3), pp. 40–54. doi: 10.2307/41165942.

Polanyi, M. (1966) *The tacit dimension*. Doubleday.

Phillips, P. P. (2007) *The ROI fieldbook : strategies for implementing ROI in HR and training*. Butterworth-Heinemann. Available at:
https://books.google.ru/books?id=xuB9uHIvKEIC&dq=Phillips+1997+online+learning+cost+matrix&hl=ru&source=gbs_navlinks_s (Accessed: 1 February 2019).

Poirier, C. R. and Feldman, R. S. (2012) 'Using technology to enhance teaching and learning.', in *Evidence-based teaching for higher education*. Washington: American Psychological Association, pp. 39–57. doi: 10.1037/13745-003.

Ray, Tim (2009). Rethinking Polanyi's concept of tacit knowledge: From personal knowing to imagined institutions. *Minerva*, 47(1) pp. 75–92.

Roth, W.-M. (2004) 'INTRODUCTION: "Activity Theory and Education: An Introduction";', *Mind, Culture, and Activity*, 11(1), pp. 1–8. doi: 10.1207/s15327884mca1101_1.

Savage, M. (2019, December 18). How To Choose The Right Blended Learning Model For Your Corporate Training. Retrieved from
<https://elearningindustry.com/right-blended-learning-model-corporate-training-choose>
 (Accessed: 6 February 2020).

Shabani, K. (2010) *Vygotsky's Zone of Proximal Development: Instructional Implications and Teachers' Professional Development*. Available at: www.ccsenet.org/elt (Accessed: 1 February 2020).

Shaw, G. and Marlow, N. (1999) 'The role of student learning styles, gender, attitudes

and perceptions on information and communication technology assisted learning', *Computers and Education*. doi: 10.1016/S0360-1315(99)00020-2.

Stahl, G., Koschmann, T. and Suthers, D. (2006) *Computer-supported collaborative learning: An historical perspective*. Available at:
http://gerrystahl.net/cscl/CSCL_Chinese_traditional.pdf (Accessed: 1 February 2019).

Taylor, M. (2002) 'Imagination as the Centerpiece of Human Cognition', *Social Development*. John Wiley & Sons, Ltd (10.1111), 11(4), pp. 591–594. doi: 10.1111/1467-9507.00217.

Thompson, J. (2016) 6 Blended Learning Models: When Blended Learning Is What's Up For Successful Students - *eLearning Industry*. Available at:
<https://elearningindustry.com/6-blended-learning-models-blended-learning-successful-students>

Tshabalala, M., Ndeya-Ndereya, C.,N., van der Merve, T. (2003) 'Electronic journal of e-Learning : EJEL.' Management Centre International Ltd. Available at:
https://www.researchgate.net/publication/287527573_Implementing_blended_learning_at_a_developing_university_Obstacles_in_the_way (Accessed: 17 February 2020).

Vigotsky L.(1978) *Mind in Society. The Development of Higher Psychological Processes*. Edited by M. Cole et al. Harvard University Press Cambridge, Massachusetts London, England.

Vincent, A. and Ross, D. (2001) 'Personalize training: determine learning styles, personality types and multiple intelligences online', *The Learning Organization*. MCB UP Ltd, 8(1), pp. 36–43. doi: 10.1108/09696470110366525.

9. Appendices

9.1. Table 1. Number and Ratio of Educational Sessions Held from March to May 2020

	20	29.03.20	05.04.20	12.04.20	19.04.20	26.04.20	03.05.20	10.05.20	17.05.20	24.05.20	31.05.20	#											
Baku	24	online	27	online	32	online	17	online	21	online	21	online	22										
Birbidian		online	4	online	4	no	0	online	1	online	5	online	4	online	3	no	0	no	0	b&m	7		
Bobruisk	4	b&m	4	b&m	4	online	6	online	5	b&m	4	b&m	6	online	5	online	5	online	5	online	4		
Brvansk	5	online	7	online	9	online	2	online	5	online	4	online	3	online	3	online	4	online	6	online	6		
Vinnitsa	3	online	7	b&m		online	5	online	5	online	3	online	9	online	8	online		online	5	no	0		
Vitebsk	0	b&m	2	b&m	2	online	1	no	0	no	0	b&m	2	b&m	2	online	3	no	0	no	0		
Valaogorad	7	online	11	online	8	online	8	online	11	online	27	online	12	online	6	online	7	online	8	online	5		
Gomel	7	online	4	online	11	online	5	online	6	online	6	online	2	online	2	online		online	3	no	0		
Donetsk	6	online	7	online	9	online	3	online	7	online	7	online	8	online	4	online	5	online	8	online	5		
Yekaterinbura	5	online	10	online	7	online	10	online	12	online	12	online	10	online	7	online	14	online	6	no	0		
Zhitomir	16	online	15	online	9	online	10	online	17	online	14	online	20	online	26	online	13	online	12	no	0		
Zaporozhie	6	online	6	online	6	online	7	online	6	online	6	online	7	online	8	online	7	online	8	no	0		
Kazan	2	no	0	online	1	online	1	no	0	online	1	no	0	no	0	online	1	no	0	no	0		
Kaluaa	6	b&m	4	b&m	5	online	7	online	5	online	6	online	7	online	5	online	6	online	5	online	7		
Kiev	10	online	8	online	11	online	7	online	7	online	7	online	5	online	7	online	8	online	12	online	3		
Kiev Simha	14	online	11	online	2	online	0	no	0	online	6	online	13	online	13	online	13	online	6	online	15		
Kiravoarad	6	online	7	online	6	online	6	online	6	online	6	online	7	online	7	no	0	online	2	online	7		
Krasnodar	7	online	6	online	6	online	4	online	4	online	9	online	10	online	4	online	11	online	6	online	9		
Krasnovarsk	0	b&m	8	b&m	5	online	7	no	0	online	6	no	0	online	5	online	6	online	4	online	4		
Kremenchua	7	online	7	online	8	online	7	online	7	online	8	online	9	online	9	online	7	b&m	5	no	0		
Kryvoi Raa	8	b&m	8	online	8	online	6	online	7	online	7	online	7	online	6	online	7	online	7	no	0		
Mariupol	12	online	7	online	5	online	6	online	6	online	6	online	5	online	6	online	6	online	4	online	8		
Minsk	12	online	11	online	14	online	11	online	12	online	17	online	15	online	16	online	15	online	7	online	17		
Moalev	5	online	6	online	8	online	4	online	8	online	7	online	7	online	4	online	6	online	11	online	8		
Moscow	50	online	47	online	48	online	64	online	37	online	12	online	28	no	0	online	15	online	10	online	42		
Moscow Loft	24	online	10	online	23	online	9	no	0	online	12	online	7	no	0	online	10	online	28	no	0		
Nizhniy Novgorod	9	online	8	online	8	online	9	online	9	online	10	online	8	online	9	online	11	online	7	online	9		
Nikolaev	10	online	10	online	11	online	11	online	7	online	10	online	13	online	10	online	8	online	10	no	0		
Novosibirsk	7	online	7	online	6	online	1	online	5	online	2	online	3	online	1	no	0	no	0	online	4		
Odessa	15	online	10	b&m	16	online	17	online	13	online	10	online	8	online	18	online	8	online	8	online	10		
Omsk	3	online	6	online	5	online	4	online	3	online	4	online	4	b&m	1	online	4	online	5	no	0		
Orel	1	no	0	online	2	online	1	no	0	online	1	no	0	no	0	no	0	no	0	no	0		
Orenbura	11	online	6	online	6	online	7	online	6	no	-	online	13	online	4	online	8	online	4	no	0		
Perm	1	online	5	online	10	online	4	online	11	online	6	online	7	online	6	online	8	online	3	online	4		
Riaa	13	online	3	online	7	online	3	online	6	no	0	online	3	online	3	online	4	no	0	b&m	11		
Roston	13	online	14	online	13	online	11	online	7	online	12	online	12	online	11	online	8	online	9	online	22		
Samara	10	online	10	online	6	online	8	online	5	online	7	online	6	no	0	online	8	online	7	no	0		
Sant Petersburga	9	online	13	online	14	online	9	online	15	online	16	online	10	online	11	online	18	online	15	online	10		
Saratov	8	online	6	online	7	online	5	online	7	online	5	online	5	no	0	online	5	online	4	online			
Smolensk	0	no	0	no	0	b&m	3	no	0	online	3	online	3	no	0	no	0	no	0	no	0		
Tallinn	8	online	9	online	8	online	3	online	5	no	0	online	6	online	3	no	0	online	4	no	0		
Tolliaiti		b&m	3	b&m	3	b&m	3	no	0	online	3	online	2	no	0	no	0	b&m	2	no	0		
Tomsk	8	online	9	online	12	online	11	online	9	online	7	online	7	online	5	no	0	online	9	online	14		
Ulianovsk	6	online	6	online	3	online	5	online	5	online	4	online	6	online	4	online	6	online	4	online	5		
Ufa	10	online	8	online	10	online	10	online	5	online	7	online	5	no	0	online	6	online	4	online	6		
Khabarovsk	5	online	5	online	5	no	0	online	5	online	3	online	3	online	2	no	0	no	0	online	5		
Kharkov	17	online	15	online	11	online	15	online	16	online	15	online	15	online	11	online	11	online	14	no	0		
Kharkov 2	11	online	12	online	8	online	10	online	7	online	9	online	9	online	10	online	9	online	9	no	0		
Cheliabinsk	6	online	6	online	8	online	2	online	3	online	5	online	5	online	6	online	4	online	3	online	6		
Cherkasv	11	online	10	online	11	online	9	online	7	online	9	online	9	online	6	online	10	online	7	no	0		
Cherniaov	0	online	2	online	2	no	0	online	3	online	2	no	0	no	0	online	2	no	0	no	0		
Chernavtsv	5	online	8	online	8	online	4	no	0	online	3	online	6	no	5	online	5	no	0	no	0		
Kherson	5	online	8	online	8	online	10	online	8	online	10	online	11	online	6	online	10	online	8	online	5		
	448		443		459		388		362		382		404		305		353		321		280		
																						SUM	4145

9.2. Table 2. Use of Most Used Technological Tools in Different Educational Formats at March 2020

Events & activities/ Tools	WebSite	WhatsApp	Telegram	Instagram	Google doc	Google form	Zoom
Online local club meetings	-			+	-	-	
Online games and Mega Events	-			+	-	+	
Regional webinars/ seminars/ camps	-			+	+	-	
Live	-			+	-	-	
Polls/ Feedbacks	-			+	-	+	

9.3. A Questioner for the Interviews with Teenagers

1. Knowledge as a value - the importance of gaining a source of knowledge

- a. In this section, we find out how inclined the respondent is to gaining new knowledge, in what format and in what fields they do this with the most interest. This section also serves as an icebreaker.
- b. Do you enjoy learning new things (we'll call this learning, but not just in school)?
- c. How do you prefer or enjoy learning?
- d. Do you think you can learn something truly useful online?
- e. Do you spend a lot of time on the internet? What do you do there?
- f. Are you interested in interacting with other people online? Is it real communication, can you focus on it?
- g. Which communication formats do you prefer - text, video, sound?
- h. What do you like to do? What do you love to do, create?

2. Challenges and opportunities

This section allows us to get answers to questions about how the respondent relates to challenges in general and how they are used to reacting to them.

- a. How do you understand the words 'entrepreneurship' (business), "entrepreneur"?
- b. Do you want to be an entrepreneur in the future?
- c. Do you know the word "proactive"? How do you understand it?
- d. Do you think you are proactive?
- e. Do you believe that being proactive is the only possible lifestyle?
- f. Do you think that to be successful, a person needs to communicate with many people?
- g. Should these people belong to one community?
- h. Is it important for you and the people around to share the same values?

3. Believing in oneself

In this section, we get an idea of how the respondent assesses their personal chances and opportunities.

- a. Who do you want to become when you grow up?
- b. Are you worried about the future, about what's happening in the world? What exactly?
- c. What challenges exist for children today?
- d. Do you think a lot in life depends on you?
- e. If to achieve some goal - organize a holiday, get the grade you need - you need to act correctly for a long time, do you feel comfortable? Or do you want everything to work out immediately, and feel anxious from prolonged waiting for the result?
- f. Can entrepreneurship be the tool that allows you to make yourself better and/or make the world better?
- g. Do you think if there was a guide, curator, coach, who would answer your questions and give hints, it would be easier for you to achieve your goals?
- h. How would you like to create value for the world, to benefit people?

Non-exclusive licence to reproduce the thesis and make the thesis public

I, Tumanov Tatiana,

1. grant the University of Tartu a free permit (non-exclusive licence) to

reproduce, for the purpose of preservation, including for adding to the DSpace digital archives until the expiry of the term of copyright, my thesis

“Participatory Approaches to Educational Technology: Navigating Temporary Solutions and Strategic Developments during the Pandemic”,

supervised by Prof. Emanuele Bardone.

2. I grant the University of Tartu a permit to make the thesis specified in point 1 available to the public via the web environment of the University of Tartu, including via the DSpace digital archives, under the Creative Commons licence CC BY NC ND 4.0, which allows, by giving appropriate credit to the author, to reproduce, distribute the work and communicate it to the public, and prohibits the creation of derivative works and any commercial use of the work until the expiry of the term of copyright.

3. I am aware of the fact that the author retains the rights specified in points 1 and 2.

4. I confirm that granting the non-exclusive licence does not infringe other persons' intellectual property rights or rights arising from the personal data protection legislation.

Tumanov Tatiana
02/06/2023



Emanuele Bardone
02/06/2023

