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INDIVIDUAL LEARNING PREFERENCES - PERCEIVED BENEFITS OF TAILORING ONLINE LEARNING TO LEARNER PREFERENCES IN PROFESSIONAL HIGHER EDUCATION

MA thesis

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Tartu, 2022

Abstract

The focus of the given study is on enhancing students' online learning experiences. This master's thesis explores Estonian Aviation Academy 3rd year pilot students' perceptions towards a tailored online course adapted according to each student's learning preferences. Participants' learning preferences were determined through a well-established and validated instrument, which consisted of questions about learning and measured views of learning. Then, according to the results of the questionnaire, content for each of the learning preferences was created. Upon completion of the course the main data for the study was collected by completing a questionnaire, which was designed to get insights into students' perceptions of the tailored online learning experience. Thematic analysis for revealing recurring themes was used. The findings indicate that although learning preferences tend to change, participants felt motivated and in charge of the learning process. Overall students had a positive experience being engaged in an online course tailored to their learning preferences.

Keywords: learning preferences, personalized learning, online learning, tailored courses.

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Introduction

Education is undergoing a shift towards online learning, or at least the notion of its relevance in education has been brought to our attention in the past few years. There is a shift in education from the traditional education system to "an education system embodying the "new normal"". (OECD, 2019) The term "new normal" refers to something new, that has never been used before and in the context of education it refers to a set of features, like focusing on students well-being and learning process instead of only outcomes, recognizing that learning progression is non-linear, monitoring focus is shifted towards continuous improvement through frequent feedback, the variability of assessment according to the purpose of the assessment and students' agency. (OECD, 2019) The need to comply with the prospective employers' expectations and at the same time to provide personalized learning paths to students has already been in the centre of educational professionals' discussion for quite some time. In their publication on education the OECD has emphasized the need to focus on more personalized learning (OECD, 2019). This personalized approach is important for individuals to realize their full potential and therefore promote their professional development.

This thesis will focus on some of the features in transition to become the "new normal". One of which is the shift in approach to effectiveness and to quality of school experience. In the "new normal" students' learning experiences and their holistic well-being are increasingly important. (OECD, 2019)

An adult learner takes initiative and responsibility for their learning, is free to set goals and define what is worth learning (Loeng, 2020). These are the actions, which one can readily attribute to a positive learning experience and why tailoring courses to accommodate students' independence becomes important.

There is research available, that explores if technology models that support personalized learning in higher education are effective (Alamri, Watson, & Watso, 2021), there is some research on the topic of tailoring online learning to learning preferences (Aleven, McLaughlin, Glenn, & Koedinger, 2016) and some discuss students' perceptions of online learning in general (Landrum, Bannister, & Garz, 2021; Nassoura, 2020). However, little is

known about students' perceptions of tailoring online learning to their learning preferences in Estonian professional higher education. Therefore, this is the gap this thesis tries to bridge.

A recent study conducted by Cicha, Rizun, Ruteck, and Strzelecki (2021) to determine students' expectations toward distance learning covered the period of the pandemic and the authors observed that students were happy and comfortable with participating in classes from their homes, they were enjoying it, one of the most prominent features that learners enjoyed in the process was online courses' usefulness and ease of use, and students self-efficacy was increased, students were confident that they would be able to follow different tasks using computer software for distance learning (Cicha, Rizun, Ruteck, & Strzelecki, 2021). Therefore, it is evident that educational technology tools will give ample possibilities for tailoring courses to students' learning preferences. The aim of the current study is to explore the perceptions of Estonian higher education learners with regard to the online learning experience tailored to their preferences. Accordingly, the following research questions (RQ) have been formulated:

1. How does learners' awareness of their learning preferences change from pre-tailored to post-tailored online learning experience?
2. What are the learners' perceptions of the online learning experience tailored to their learning preferences?
3. Which areas of learning are most enhanced in a tailored online course?
4. What tendencies can be observed with regard to learning outcomes as a result of tailored online learning?

The practical implications of the study may prove useful for course designers and teachers alike, to explore the possibilities of tailoring courses to enhance students' online learning experience.

Overview of the thesis

The thesis consists of five chapters. Chapter 1 covers the theoretical background and gives an overview of the theories and concepts the thesis proceeds from and discusses previous research on the topic. Chapter 2 describes methods used for conducting the study, it contains a description of the sample, the tools used and the data. Chapter 3 presents the results. Chapter 4 includes the discussion and focuses on interpreting the results. The final chapter, Chapter 5, draws conclusions, mentions the limitations of the study and gives suggestions for future research.

1 Theoretical background

In the theoretical background the literature review will be given with regard to the theories of learning styles and learning preferences, the approach adopted for the thesis is discussed and definitions will be presented. Comprehensiveness, topicality and relevance were considered when selecting literature.

1.1 Learning styles and learning preferences

It is widely accepted that people tend to learn in different ways and different researchers have tried to classify the ways in which people learn. For example, there are the Kolb's Learning Style Inventory, Dunn and Dunn's learning modalities, to name a few, that were among 13 models reviewed by Coffield et al (Coffield, Moseley, Hall, & Ecclestone, 2004). Different theories are based on array of different approaches, like determining learning styles based on personality type, cognitive features or sensory modalities and are therefore conceptually complex.

In their comprehensive overview Coffield and colleagues (2004) reviewed 13 theories of learning styles and determined 5 families of learning styles (Coffield, Moseley, Hall, & Ecclestone, 2004). These include:

- constitutionally-based learning styles and preferences
- cognitive structure
- stable personality type
- learning approaches and strategies
- 'flexibly stable' learning preferences.

However, for this study, I will focus on the 'flexibly stable' learning preferences and learning approaches and strategies. This is because, unlike the other 4 learning families of learning styles, flexibly stable learning preferences give a less rigid notion that a learning style is fixed. For the purpose of this thesis the distinction between learning styles and learning preferences is made that rather than discuss the different learning styles, which may imply that learning is static and unilateral, the assumption used here is that people may exhibit differences in learning due to their learning preferences. Learning preference is more dynamic and multifaceted, meaning that preferences may differ according to a task or time or subject and multiple preferences may be used throughout learning.

For the purpose of introducing grounding theories of the field, one of the more flexible learning style concepts is discussed next. Namely, the widely known Kolb's experiential

learning model. The model makes use of a questionnaire, Learning Inventory, which has evolved over more than five decades. The most recent version of it is from 2011. Kolb and colleagues (2014) define the learning style as a descriptor of the unique ways individuals go through the proposed learning cycle based on their preference (Kolb, Kolb, Passarelli, & Sharma, 2014). According to Kolb the preferred way of differentiating between learning styles or modes, like he calls them, is developed due to one's genetics, life experiences and the challenges of the present environment. Therefore, he argues that the "learning style is not a fixed personality trait, but more like a habit of learning shaped by experience and choices" (Kolb, Kolb, Passarelli, & Sharma, 2014, p. 215). He calls on a definition of *accentuation* – "the way we learn about a new situation determines the range of choices and decisions we see, the choices and decisions we make influence the next situation we live through and this situation further influences future choices" (Kolb, Kolb, Passarelli, & Sharma, 2014, p. 215). Kolb's learning cycle model emphasizes that learning requires different styles at different stages of the learning process. And as such gives importance to flexibility of learning, that individuals may adapt their learning styles according to the learning situations.

It is equally important to note that the firm belief of the existence of learning styles has been widely scrutinized and met with criticism (Bruff, 2011; Rogowsky, Calhoun, & Tallal, 2015; Nancekivell, Shah, & Gelman, 2020). Critics argue that there is little predictive validity of success if learning styles are matched with teaching style and they feel there is little evidence to support the idea that providing learning-style based instruction would be effective (An & Carr, 2017). Furthermore, critics have convincingly argued that there is little evidence to suggest that learning style is a static and a unilateral concept. An and Carr (2017) argued the lack of explanation as to what developmental processes and causal mechanisms underlie the behaviours learning styles categorize, they point to problems with measurement and poor reliability and validity of rigid learning style theories (An & Carr, 2017). In addition to focusing on the critical issues of learning style theories, An and Carr suggest alternative approaches for catering to different preferences, e.g. they suggest activating multiple representation using a wide selection of multimedia (texts, pictures, sounds, movies etc.). Therefore, in this thesis the emphasis is on fluidity of the preferences.

Having discussed one of the more grounding theories behind learning preferences the following section addresses another way of differentiating between learning preferences as proposed by Simons and Ruijters who define *learning metaphors* – "a metaphor is a mental construction that helps us to structure our experience and to develop our imagination and reasoning" (Simons & Ruijters, 2008, p. 242). Their work mainly revolves around a

professional setting and several factors of their work have influenced the construction of this thesis. The most influential factor being that the sample consists of students in professional higher education and the emphasis of their studies is on professional development and as much as applicable, real life working situations. Another contributing factor is that Simons and Ruijters (2008) have devised an instrument according to their theory to find out the individuals' learning preferences/metaphors.

Simons and Ruijters describe five prototypical learning metaphors (Simons & Ruijters, 2008):

- apperception – metaphor that describes the learner as an individual who performs best under pressure, in an everchanging working environment. A person, who observes the expert and learns by example. Individuals who prefer the apperception metaphor learn best in the real world, instead of an academic one.
- participation – metaphor that describes the learner, who enjoys a social setting. They learn best in groups, where knowledge is constructed in communication and interaction. They benefit from discussion to clarify and explain thoughts and ideas, feedback from others is encouraged.
- acquisition – metaphor that describes the learner, who can be regarded as the classical learner, they appreciate the transfer of knowledge and the learning skills from a teacher/expert to the student, these learners wish to obtain a result in the process of learning and they benefit from regular testing to measure the outcomes.
- exercising – metaphor that describes the learner, who learns best in a realistic situation, though the teacher is expected to simplify situations, to provide a safe, not too complex environment. These learners benefit from training and role-play, but the emphasis is on the learning situation, they have to have the security to make mistakes. Learning can be supervised so that reflection, passing on the information and mistakes can be discussed.
- discovery – metaphor that describes the learner who views life as learning. They prefer to find their own way in situations and construct their own understanding. These learners need inspiration and find it in their life, so the learning path may not be the most efficient, but it is the most interesting one. These learners are creative and though do not require supervision, they will take an inspiring teacher seriously.

Detailed descriptions of the metaphors can be found in Appendix A. The keywords associated with metaphors are captured in below.

Figure 1. Learning metaphors and the associated keywords (adapted from Simons & Ruijters, 2008)

The authors of the learning metaphors instrument have explained the need to talk about learning, as they found that the language used to discuss it has proved to be insufficient (Simons & Ruijters, 2008).

As far as applicability of this theory to this particular research, its core strength lies in the detailed description of the metaphors and their practical implications. This is demonstrated in Table 1 below:

Table 1. Dimensions and metaphors of learning

Dimensions of learning	Apperception	Participation	Acquisition	Exercising	Discovery
Which circumstances are helpful?	In complex issues in which to come up with a solution in no time	During inspirational meetings with others	When there are many knowledge sources available	When there is space and time to practice	During work, running into new and interesting issues
Collaboration with others	I regard others as sounding boards for my ideas	In dialogue with others I solve problems easier	I learn together with others when this is more efficient	Others help me to develop	I regard others as sounding boards for my ideas
Dealing with mistakes	I do not learn a lot from my mistakes	I try to avoid them by thorough preparation	I try to avoid them by thorough preparation	I learn a great deal from my mistakes	Mistakes keep you on your toes
Which emotions are helpful for development?	Tension, stress	Security, trust	Clarity, certainty	Security, trust	Inspiration, curiosity
Who makes you think?	Critical friends from outside	Colleagues and other professionals	Experts	Colleagues and other professionals	Can be everyone
Which knowledge is important?	Expertise	Shared insights	Proven knowledge	What gives me footing	Shared insights
How do you acquire knowledge?	By looking at what works	By talking to others	By taking part in learning activities	By taking part in learning activities	By everything I do
The ideal guide has	Practical experience	Skill in steering group processes	Specialised knowledge	Pedagogical skills	Sagacity
What is annoying?	Long windedness	People who withdraw themselves from a team	Lack of knowledge, ignorance	Having to act without proficiency	Lack of space for your own influence
Preferences in training situations?	Company visits	Intervision	Lectures	Workshops	Learning within a practical assignment
Who determines your development?	Contributions to organisational development	My team	Contributions to organisational development	A coach or mentor	What I encounter in my work
Organising learning at work?	There are enough occasions in my daily work	Searching for discussions with others	Reading a good book	Deliberate practice of new behaviour	There are enough occasions in my daily work
Main trap	Being bored too soon	Failing to take time to think	Looking for the truth too long	Keeping on reflecting	Finding too many things interesting
Reactions to unknown situations?	Asking others' advises	Asking others' advises	Trying to know as much as possible about it	Finding a way to exercise	Jumping in
What makes you think?	Successful solutions	Differences in points of view	The knowledge needed	My own actions	My own actions

To each of the dimensions of learning, represented by questions in the column on the far left, corresponding description of the situation for each of the metaphors is given. This can be viewed as the basis for designing the most suitable environment for every student with a different learning preference.

Current study is aligned with Simons' and Ruijters' perception of learning preferences, and its practical applicability is the reason to be included in this study.

1.2 Tailoring online courses

The existing research on tailoring online courses and their purposes vary. Tailoring online courses may include using enriched instructional features, like real-time video, text-based chatting, collaboration with peers, online quizzes etc (Yu, 2020) or as Shearer and colleagues suggest (2020), the content can be selected either by the instructor based on individual students characteristics or by students themselves and the content provided would be multimodal and dynamic. Students' perception of tailoring an online course has been researched by Yu (2020), whose work showed how students ranked the elements according to their expectations of an online course in the order of importance, as follows:

1. 24/7 easy access to the course.
2. Self-paced learning.
3. Online quizzes.
4. Discussion boards.
5. Collaboration with peers.
6. Availability of multimedia and apps. (Yu, 2020)

Another example of students' perception of tailoring an online course has been discussed by Shearer et al. (2020). They posited that to understand the makings of a good online learning experience, researchers need to focus more on the learning experience itself than just the structure (presentation of content, assessment etc.) of the course (Shearer, et al., 2020). Their evidence showed that students highly appreciate personalized online learning experiences so they could take ownership of their learning. Other important notes on students' perceptions included their expectations toward multimodal content presentation, the option to choose one's own assessment path and suggested that content be delivered asynchronously as well as synchronously. The implications of this for this study is to deliver content in a hybrid format. The requirement for pilot-training in distance learning to be delivered in a synchronous format is derived from European Union Aviation Safety Agency (2020), but for

this study in addition to the virtual synchronous classroom, part of the course, intended for students' individual work, was delivered in an asynchronous online setting.

2   Method

The study was conducted to determine learners' perceptions regarding their experience of engaging in the course tailored to their learning preferences and it is a non-experimental, quantitative, cross-sectional survey design (Creswell, 2012). By definition cross-sectional survey examines current attitudes, beliefs, opinions or practices (Creswell, 2012) and therefore it is within the framework of this thesis.

Some of the data collected is quantitative (see the description of the questionnaire used in Table 2 subchapter 2.2 Tools) and since the study makes use of both research methods, the quantitative and qualitative, it is a mixed methods research by nature.

2.1 Sample

Convenience sampling was used, i.e. the researcher selects participants because they are willing and available to be studied (Creswell, 2012). The sample was chosen because of their availability to participate in the research (they are all students of the course I teach) and because they would be the main beneficiaries of the outcomes, i.e. students would be the ones using the tailored course and it would be tailored according to their preferences. There are 11 Estonian Aviation Academy 3rd year aircraft piloting students (all in their early 20s) in the group and all took part of the research. Participants had previously taken part of online learning, although it was a hybrid setting (asynchronous online course materials in the learning management system Moodle and synchronous meetings face-to-face). To guarantee anonymity, gender was not asked in the questionnaire, because only one person in the group is female and that would have left them exposed. Participants were assigned pseudonyms according to the order their responses were received (e.g. Participant 1, Participant 2 etc).

2.2 Tools

Two rounds of surveys were conducted. One was aimed at determining learners' learning preferences and the second was administered after the intervention, targeting the collection of data about learners' perceptions of the experience they were exposed to.

For determining students' learning preferences, I have opted for the instrument that has been developed by prof dr P. Robert-Jan Simons and dr Manon C.P. Ruijters MLD, as part of

Language of Learning Twynstra Gudde in Utrecht University (Simons & Ruijters, 2008). The instrument was developed for a professional setting and since the students composing the sample are inherently studying for a profession, their training is basically an on-the-job training, then this instrument was chosen for the intervention. It has already been tested by the authors, its validity and internal consistency was well established, therefore it did not require further action for improvement. The questionnaire consists of 15 questions, each followed by 4 or 5 statements and the respondent is expected to rate the statements on a scale from 1 to 5, from the least pleasant (1) to most appealing (5); the average preference would be scored a 3. See Appendix B for more details. The results will be shown as columns of varying lengths, longest representing the respondent's first learning preference, i.e. the metaphor. The intervention designed for this project was carried out in the learning management system Moodle, therefore, the Microsoft Excel spreadsheet of the instrument was disseminated in Moodle and the filled-out file was uploaded to Moodle as well.

Questionnaire to explore students' perceptions about the intervention was administered through Google Forms. The questionnaire is appended to this thesis, see Appendix C. The structure of the questionnaire can be seen in the Table 2. The questionnaire comprised of 43 questions/statements divided into 3 distinct parts. The 1st part asked general questions about the background, students' previous experiences with tailored courses and their awareness of learning preferences. The 2nd part of the questionnaire focused on the perception of a course tailored to the learning preference. Questions were asked about students' perceptions to understand in detail, what aspects of the tailored course were to their liking and if they would in the future participate in courses tailored to their learning preferences. The last part of the questionnaire focused on the aspects of learning that were enhanced during the intervention. The questions were formed as statements and a 5-point Likert-type scale with predetermined responses were given (strongly agree, agree, somewhat agree, disagree, strongly disagree). In addition to the statements and closed questions, the questionnaire sought deeper insight into students' perceptions and therefore the statements were followed by sections for comments from the participants, thus providing participants with the possibility to explain their choices in their own words.

Table 2. Structure of the questionnaire exploring students' perceptions of tailoring an online course to their learning preferences

Subsection	Data	Presentation in the questionnaire
Background - Preferred Learning Styles: Previous experience and current awareness	Quantitative and qualitative	6 statements and closed questions rated on a 5-point scale; 1 section for free comments from the participants
On the perception of a course tailored to the learning preference	Quantitative and qualitative	12 statements rated on a 5-point scale; each statement followed by a section for free comments from the participants
On enhancing the learning experience with a course tailored to learning preferences	Quantitative and qualitative	11 statements rated on a 5-point scale; 1 section for free comments from the participants
Conclusion	Qualitative	A section for final comments from the participants

A pilot survey was conducted to test the questionnaire. 3 students were personally asked to participate in the pilot survey, because they had actively taken part in the previous course and their input could prove useful, 2 responded. Their notes about the questionnaire were incorporated, these included the suggestion to add a question about the second learning preference, since some were rather fluid in using their preferences (i.e. used tasks tailored to either the first 2 or multiple learning preferences), one suggestion was made about rephrasing a question to be more explicit and one general comment saying that the respondent liked that on the rating scale the option of "neutral" was not given. After the modifications the questionnaire was sent to the rest of the cohort.

For RQ 4 about the tendencies of the outcomes of the course, data from study information system was retrieved for the first and second semester of the course. The data was compared in Microsoft Excel.

2.3 Procedure

The intervention for this research took place in the fall semester 2021 as part of a course called "Aviation meteorology" in Estonian Aviation Academy, which is a professional higher education institution and studies rely heavily on practical job-related curricula. The course is

spanned out across 3 semesters and the intervention was part of the online course in the 2nd semester. The course is a natural science course and over the 3 semesters students are expected to acquaint themselves with knowledge of meteorology and its effect on aviation in detail, so they can make informed decisions about the flight safety influenced by the weather.

For the intervention, the students completed a questionnaire to determine their learning preference, i.e. the metaphor (Simons & Ruijters, 2008) (see Appendix B). None of the students reportedly had previously taken a learning preferences' test. After the students' learning preferences were determined, they were given access to tailored content on an online course in Moodle. Students were asked to focus on content tailored to their first preference, although they had access to all of the content, including the content tailored to other preferences. Students, whose first and second learning preference, as determined by the instrument, were equally scored, had the option to focus on the content as they themselves saw fit.

Students' most preferred learning metaphors did not include the apperception metaphor (the learning preference, where one learns best under pressure and in a challenging environment). The learners' distribution according to their learning preferences is presented in Figure 2 below (2 of the participants opted not to respond to the second preference question).
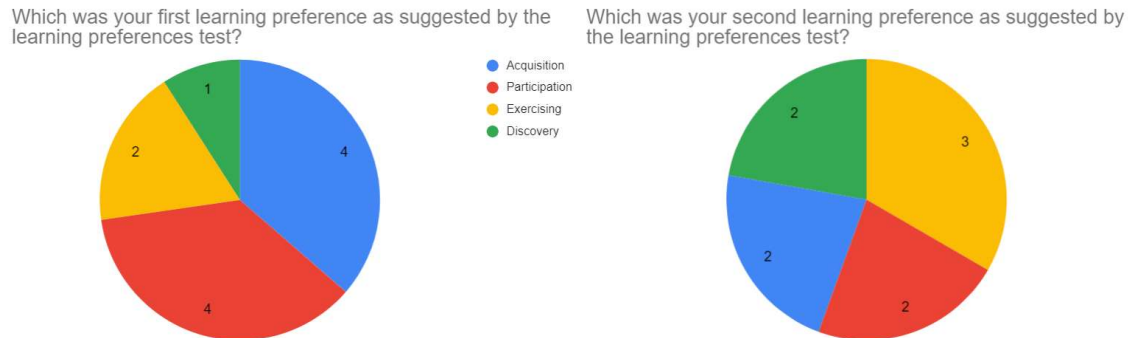
Figure 2. Students' learning preferences

Examples of the tailored content according to the metaphor are presented below (details about the metaphors and their descriptions can be found in Chapter 2, under the subchapter 1.1 Learning styles and learning preferences and Appendix A):

Acquisition – 4 students were categorized to have acquisition metaphor as their first learning preference. The acquisition metaphor implies that students learn best by having multiple knowledge sources. Therefore, for this metaphor reading materials, videos and external links to other materials accompanied by single-choice tests were created. Below (Figure 3) you can see

an example of a tailored topic. Students can readily see their preferred metaphor highlighted by a colour and the name of the metaphor. Within the topic they can see the task explanation (Read and look through the study materials and take the test. Textbook ch. 10. In Figure 3 in Estonian: *Tööta läbi viidatud õppematerjalid ning tee test. Õpik ptk 10.*) and they have access to the materials and the test. In topics, where applicable, some guidance materials are present (e.g. in Figure 3 there are some explanations meant to accompany the test: Explanations to the test on wind, in Estonian: *Selgitused tuule testi küsimustele.*).
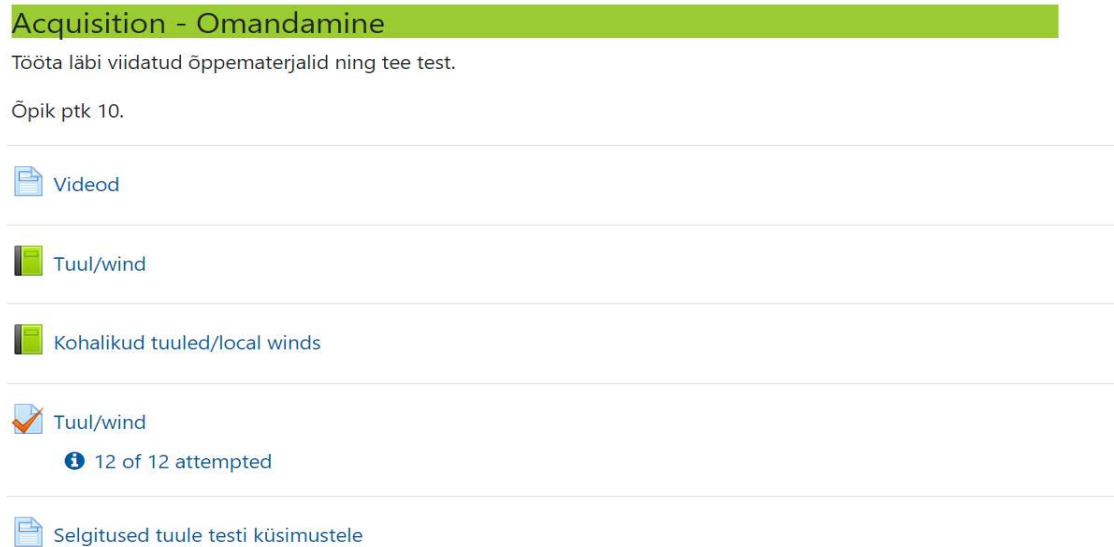
Figure 3. An example of a tailored topic – Acquisition metaphor

Exercising – 2 students were categorized to have exercising metaphor as their first learning preference. The exercising metaphor implies that students learn best by repetition. Due to the nature of the course (meteorology) the repetitive part was the weather observation diary, but the theme of the observation diary differed according to the topic. Example below in Figure 4 asks the students to keep an observation diary on 3 days, taking notes of wind speed and direction at different airfields. In addition, they are asked to take note of wind speed and direction on the significant weather chart and make notes of local winds around the Mediterranean Sea and Northern Africa. The diaries were compiled in Google Forms and access to the links of those forms were given.

Exercising - Harjutamine

Pea vaatluspäevikut, kuhu märgid kolmel päeval (eriti hea, kui saad seda teha osana õppelennu ettevalmistusest) Tartu, Tallinna, Kuressaare, Kärdla ja Ämari tuule info. SIGWX-kaardilt (LINK) märgi 2000ft kõrgusel tuule suund ja kiirus. Ning Windy-st püüa tuvastada kohalikke tuuli Vahemerel (mistral, bora, föhn) ja Põhja-Aafrikas (kõrbetuuled).

Päeviku vormi leiad siit:

1. Päeviku sissekanne: https://forms.gle/jbQ7e6WAY5FxNNLi9

2. Päeviku sissekanne: https://forms.gle/vAEsmfgUZwYbMcRN6

3. Päeviku sissekanne: https://forms.gle/8Uv3cquudyU7Wj5m6

Figure 4. An example of a tailored topic – Exercising metaphor

Participation – 4 students were categorized to have participation metaphor as their first learning preference.[1] Since the participation metaphor implies that students best learn in collaboration, for this group of students, jigsaw assignments were designed. Jigsaw method involves groups of students working on a set of tasks, with each student being assigned a particular task (part of the 'jigsaw') (Hattie, 2012). In Figure 5 below, you can see an example of a topic tailored for the group: students can decide among themselves, who gets to take which role. The 4 roles (in Figure 5 in Estonian: *1. roll* etc.) are described as follows: 1st role – find out about the names of local winds and their descriptions (area, time of occurrence); 2nd role – describe the effect of each of the winds for aviation; 3rd role – find visuals (video) to accompany each of the winds and give examples of airfields which experience the winds; 4th role – find a time for all of the team-members to work together on the assignment, make a summary and post it in the assignment section.

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[1] Note: for 2 of the participants the Participation metaphor was equally the first and second preference and they were instructed to take part of both tailored contents as they themselves saw fit.

Participation - Osalemine

Kui meeskonnaliikmete arvus toimub muudatusi, jaotage rollid sobivalt ümber ja märkige need kokkuvõttesse.

Teie meeskonnas on 4 osalejat ning on teie omavaheline otsus, kellele milline roll jääb. Teie ülesande tulemusena liitub igaühe panus tervikuks ning esitate ühiselt teema kokkuvõtte. Teema kokkuvõtte loomisel leidke ühine aeg üksteisele oma tulemuste tutvustamiseks ja selgitamiseks.

1. roll: Leia erinevate kohalike tuulte nimetused ja kirjeldused (piirkond, esinemise aeg).

2. roll: Kirjelda iga tuule mõju lennundusele.

3. roll: Leia igale tuulele sobiv visuaal (video) ja too näiteid lennuväljadest, mis iga tuule mõjualas paiknevad.

4. roll: Leia meeskonnakaaslastele ühine aeg teema läbitöötamiseks, valmista kokkuvõte ning postita see Grupitöö tulemuse alla.

Figure 5. An example of a tailored topic – Participation metaphor

Discovery – 1 student was categorized to have discovery metaphor as their first learning preference. Since the discovery metaphor implies that learning benefits the most from freedom, then these assignments were the most generally described. Students were basically given the end goal and left to find their own best way to achieve that goal. For example, on the Figure 6 below, the task is described: you can choose the methods to acquire the topic yourself, but the end goal is to produce a map, where different winds and their descriptions would be seen. During the discovery process you will find out about different local winds, their areas and effects on aviation. In addition, some examples are linked, to spark the students' creativity.

Discovery - Avastamine

Meetodid peatüki omandamiseks valid ise, aga eesmärgiks on luua maakaart, millel erinevate tuulte asukohad ja kirjeldused oleksid esile toodud. Avastamise käigus omandad teadmised erinevatest kohalikest tuultest, nende asukohtadest ja nende mõjudest lendudele. Töö postita alla ↓.

Lisaks õpikule, võid ühe allikana kasutada nt seda loetelu: https://www.metoffice.gov.uk/weather/learn-about/weather/types-of-weather/wind/wind-names

Figure 6. An example of a tailored topic – Discovery metaphor

Altogether 8 topics were tailored during the course, which included 22 observation diaries for the exercising metaphor, 10 tests for the acquisition metaphor, 8 jigsaw assignments for the participation metaphor and 8 assignments for the discovery metaphor.

In the original questionnaire by Simons & Ruijters (2008), besides the metaphors described above, there was the fifth – Apperception. However, due to the fact that none of the participants fell under that category, it is not included as part of the course design.

On completion of the course, the students were asked to fill out a questionnaire, which was designed to gather data about their perceptions of the intervention. The detailed description of the questionnaire is given in subchapter 2.2 Tools.

The data pertinent to the last research question (RQ 4, the tendencies of the outcomes of the course) was retrieved from study information system. The data was presented as a grading protocol summary, where the result of the final assessment was evident. Two of such protocols were retrieved, one from the first semester of the course and the second one from the following semester, when the intervention took place.

2.4   Data analysis

The study aims to gain insight into how online instruction in professional higher education setting could be personalized by tailoring content to learners' preferences and how this individualization might be perceived. The data was grouped according to the research questions and different techniques were used for its analysis.

The data pertinent to RQ 1, about learners' awareness of their learning preferences, RQ 2, about learners' perception, and RQ 3, the enhanced areas of learning, was collected in Google Forms and for the quantitative data numerical information and for the qualitative data text grouped into a section was output within the Google Forms built-in data representation. A Microsoft Excel file of the data was downloaded as well. In the spreadsheet the data was organized by participant, each line representing the data pertinent to that particular participant. Quantitative data of the attitudes towards statements were analysed on 5-point Likert-type rating scales (strongly agree, agree, somewhat agree, disagree, strongly disagree).

Braun and Clarke's (2006) inductive thematic analysis was used to develop themes from the qualitative data, which came from the open-ended questions in the questionnaire to explore students' learning preferences and perceptions about the intervention. The data was manually analysed. Microsoft Excel was used to store and group the data. Microsoft Word was used for reading and highlighting. Miro was used to draw a mind map of the recurring themes. No specific statistical analysis software was used. Phases for the analysis suggested by Braun and Clarke (2006) were used for the thematic analysis. In Table 3 you will see the phases and descriptions of the analysis process (adapted from Braun and Clarke (2006).

Table 3. Phases of the thematic analysis

Phase	Description of the process
Phase 1. Familiarizing with the data:	Reading and re-reading the data, noting down initial ideas, copying the text-based data from Microsoft Excel to Microsoft Word and highlighting recurring words and/or ideas (e.g. positive notions and negative connotations).
Phase 2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code (e.g. missed face-to-face interaction; perceptions about time (took longer or time spent on a task was reduced); general awareness etc).
Phase 3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme (e.g. perceived negative aspects vs perceived positive aspects; neutral statements; statements about learning preferences and perceptions).
Phase 4. Reviewing themes:	Checking if the themes work in relation to the coded extracts and the entire data set, generating a thematic 'map' of the analysis.
Phase 5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme (see).
Phase 6. Producing the report:	Providing examples of extracts, writing the analysis chapter.

In Figure 7 below you can see a mind map of the thematic analysis, which revealed two distinct themes: learning preferences and perceptions. Keywords associated with respective

themes are the following: changed awareness, freedom of choice, uncertainties with learning preferences and enjoyment, time-consuming, structure.
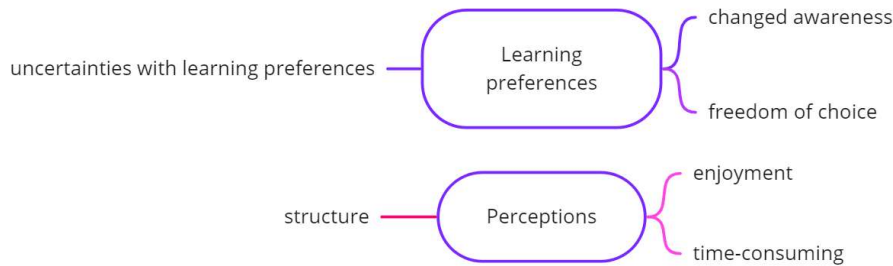
Figure 7. Mind map of themes

For RQ 4, the tendencies observed with regard to learning outcomes, the results of the two assessments (the first and second semester) were compared in Microsoft Excel. The data retrieved from study information system was output as Microsoft Excel spreadsheet where two columns each represented the assessment of the respective semester. Each line represented the outcomes of a student. The difference between the two columns of the results was calculated to see a change in the outcome.

3   Results

The results of the present study will be presented according to the same sequence as the research questions presented in the chapter 1. Introduction above.

RQ 1 How does learners' awareness of their learning preferences change from pre-tailored to post-tailored online learning experience?

Through the first part of the questionnaire designed to explore students' perceptions of the tailored online course information about students' previous experience with taking a learning preferences test, their awareness of learning preferences and comments about their learning preferences were collected.

It was revealed in the thematic analysis of the qualitative data coming from the responses to the open-ended questions of the questionnaire, that comments on learning preferences were a recurring theme and the associated keywords *changed awareness, freedom of choice* and *uncertainties with learning preferences* emerged. When focusing on the keywords *changed awareness* the following results were revealed: all of the participants agreed that taking a test on learning preferences helped them understand how they learn best. When asked to elaborate

how the gained knowledge of their learning preferences would affect their future studies, participants commented: "I now know what my learning preference is and how to gain knowledge best" (Participant 1) and "it sparked curiosity, I will in the future find additional external resources and for example maybe see how something is explained elsewhere …" (Participant 3). Some of the responses showed that participants had confidence in their own learning preferences and therefore they were not willing to try out other possible learning paths. To give a few examples: "I personally didn't change a lot in my learning habits and preferences during this course, because I like my style" (Participant 10), "I had already found the suitable method for myself" (Participant 2) and on another instance Participant 2 confirmed "since I like my learning preference, I didn't feel the need to do other preferences' tasks."

Another keyword mentioned in the theme of learning preferences, was *freedom of choice*, i.e. the choice between the multiple options to learn. For example, some of the participants, when asked if they would choose a tailored course over a "regular" course, commented: "I would, because it enables to discover more and find alternatives to the so-called classic method" (Participant 3), "because it gives the students more opportunities to explore for themselves, to think and process information" (Participant 4), "I would, because it gives more opportunities to experience different approaches to learning" (Participant 6) and "it somewhat gave freedom and there was the possibility to discover something yourself, in addition to the textbook" (Participant 3).

Although for most of the participants change in awareness of their learning preferences can be seen, some reported *uncertainties with learning preferences*. They commented: "I understood that the suggested learning preference did not suit me and I stayed with the classic learning method" (Participant 9), "I liked less the first preference as determined by the test" (Participant 11) and 2 of the participants commented they just liked the 2nd learning preference better.

RQ 2 What are the learners' perceptions of the online learning experience tailored to their learning preferences?

The 2nd part of the questionnaire was aimed at collecting the data to answer the RQ 2 stated above. Statements corresponding to the RQ 2, which focused on the students' perceptions of a course tailored to their learning preference (including perceptions about diagnostic testing and perceptions related to the learning process) and the quantitative data are presented in the Table 4 below.

Table 4. On the perception of a course tailored to the learning preference

Statements	Number of participants, who responded (out of 11)				
	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
1. Taking the test on learning preferences has helped to better understand how I learn best	1	4	6	0	0
2. The learning preference as determined by the test and my own personal preferences coincide	4	3	2	2	0
3. I enjoyed the process of a tailored course	4	4	2	1	0
4. The course layout was easily comprehended; the navigation was in a logical order	8	3	0	0	0
5. The tailored nature of the course was a huge factor of my success in this course	0	6	4	1	0
6. Tailored course is something I would like to experience in the future	4	3	3	0	0
7. In the future, if I had a choice, I would choose a tailored course over a "regular" course	4	2	3	2	0
8. In the future, if a lecturer would tailor a course, I would prefer the course to be tailored to the first learning preference only	1	1	4	3	2
9. In the future, if a lecturer would tailor a course, I would also like to be able to access tasks catering to other learning preferences besides my first learning preference	3	5	1	1	1
10. If attending a regular course in the future, I will still try to complement the learning process with activities in line with my learning preference	3	6	1	1	0
11. The gained knowledge of my learning preferences will affect my future studies in a positive way	3	5	3	0	0

	Yes	No
12. I will recommend this experience of a tailored course to other students	11	

Majority of the participants agreed with the given statements, the only strong disagreements were with the statements concerning the future layout of the tailored course (the same statements got more uniform responses overall). Participants agreed the most with the statement about the course's structure, enjoyment and with the future implications, i.e. they will try to complement the learning process with activities in line with their learning preference in the future.

It was revealed in the thematic analysis of the qualitative data coming from the responses to the open-ended questions in the questionnaire, that the second recurring theme was *perceptions* and the associated keywords *enjoyment, structure* and *time-consuming* emerged. On several occasions students mentioned that the tailored course was interesting, exciting, fun and a new, pleasant experience. One of the participants explained:

> As an experience it's still good, maybe some students have forced themselves throughout their lives to learn according to a questionable system, which doesn't suit them at all, e.g. someone taught them to make and use flash-cards and regularly repeat those - it could be scientifically effective, but for me the use of flash-cards kills all of the motivation to study and it could lead to apathy, although you learn the facts by heart and do the tests. Surely someone will benefit from this tailored course (Participant 8).

Another learner added: "New and interesting, alternatives are always very good and add motivation/bring excitement to studies" (Participant 3). One of the participants mentioned, they feel they do not learn as much in web-lectures as in face-to-face settings: "The only thing which hindered me, was probably the distance-learning, because I personally feel I don't learn as well on Zoom than on site" (Participant 4).

Another keyword mentioned in the theme of perceptions, was *structure*. Most seemed to agree that if they were to attend another tailored course, they would prefer it to be tailored similarly to this one. As commented by participants: "There's no doubt different ways to develop a course, but an e-course similar to this seems to work pretty well." "It was very well tailored, I don't have anything to criticize, everything was super." Although, most agreed that the layout of the course was easily comprehended, one participant commented: "It [the tailoring] made the course structure for me, and possibly for the lecturer, a bit more complicated" (Participant 5). Practicality of the tasks was mentioned by two of the participants: "In addition to theory I did more practical tasks" (Participant 9) and "… I remembered the connection between theory and practice better, if I needed to look and observe for it in practice" (Participant 10). Hesitations about the diagnostic testing were included in the keyword *structure*. Participants mostly argued that the instrument devised to

determine one's learning preferences may be inaccurate, e.g. participants said: "The test results may not coincide with your own wishes" (Participant 11), "the result of the learning preferences test may not always be the best for you or several preferences could be equally represented" (Participant 5).

The data related to the keyword *time-consuming* revealed that although two of the participants found their time spent on learning was reduced or they could plan it better, many of the participants mentioned time spent on learning as a negative factor. E.g.: "…because some other task seemed easier or less time-consuming…" (Participant 8) and "when solving the tasks, I understood that with a different learning preference I would acquire the material faster" (Participant 11). One of the participants described difficulties with groupwork due to everyone's tight schedules and another one added the difficulty in finding a place for it.

RQ 3 Which areas of learning are most enhanced in a tailored online course?

The data coming from the 3rd and final part of the questionnaire was collected to answer the RQ 3 above. Participants were asked to compare the experience of a tailored course to a regular course. Statements corresponding to the RQ 3, which focused on areas of learning that were enhanced and the data are presented in the Table 5 below. It is evident that most agreed with given statements, but what stood out was that all of the respondents agreed that their information processing skills improved as a result of the tailored online course. All of the respondents agreed (with one somewhat agreeing) that the tailored course was more entertaining. Almost half of the participants did not agree with the statement that time spent on learning was reduced. The rest of the statements were rated more uniformly (e.g. *The tailored course was easier to follow* – participants rated the statement on all rating scale points).

Table 5. On enhancing the learning experience with a course tailored to learning preferences

Statements	Number of participants, who responded (out of 11)				
	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
1. The tailored course was easier to follow	3	3	2	2	1
2. The tailored course was more entertaining	5	5	1	0	0
3. I felt more motivated during the tailored course	5	3	2	1	
4. I felt very much in charge of the learning process	2	7	2	0	0
5. The tailored course reduced the learning time	1	4	1	5	0
6. The tailored tasks were easy to complete	1	5	3	2	0
7. The tailored tasks made me reflect more on my learning process (I thought more about, what would be the best way for me to learn)	4	4	1	1	1
8. The tailored tasks improved my information processing skills (I was able to locate and collect relevant information)	6	5	0	0	0
9. The tailored tasks helped me see the connection between theory and practice	4	4	3	0	0
10. The tailored course made the process of achieving the learning objectives better	3	4	4	0	0
11. The knowledge gained in the tailored course reinforced my understanding of the subject	5	3	3	0	0

RQ 4 What tendencies can be observed with regard to learning outcomes as a result of tailored online learning?

For the RQ 4 the data collected was compared by organizing the results from assessments of the first semester and the second semester. The difference between the two sets of assessment results was calculated and a positive result was interpreted as an improvement in the outcomes and a negative result was interpreted as a decline in the outcomes. These tendencies can be seen in Table 6, below. It is evident that results for 5 students changed for the better and for 2 students the change was negative. For 4 students there was no change observable.

Table 6. Comparison of the results of two assessments

Student	1st semester (grade points out of 100)	2nd semester (grade points out of 100)	Difference between the 1st and the 2nd semester grade points
A	92	98	6
B	98	100	2
C	94	100	6
D	98	98	0
E	98	98	0
F	96	90	-6
G	98	96	-2
H	98	98	0
I	96	98	2
J	85	98	13
K	98	98	0

Note. Letters assigned to students in the far-left column do not correspond to participants' pseudonyms used elsewhere in this thesis, since questionnaires were collected anonymously and cannot be tied to the assessment results.

4   Discussion

Four research questions were formulated to help understand learners' awareness of their learning preferences, their perceptions about the experience of tailored online learning, as well as the concrete learning areas affected by the given intervention. The study also tries to identify the tendencies with regard to how tailoring the online learning environment might affect learning outcomes.

RQ 1. In the first research question the aim was to find out how learners awareness of their learning preferences changed before and after attending the tailored online course. In the questionnaire's comments sections participants shared their thoughts and doubts about their learning preferences, which means they engaged metacognitive and thinking skills,

which is consistent with the study by Yu (2020), saying that these are a key to succeeding in online courses and providing opportunities to develop these are essential.

Participants comments about the freedom of choice imply they took responsibility of their own learning and thus demonstrated agency, which is in line with the report by OECD (2019). This also implies to self-efficacy, i.e. the confidence to perform a task, which is consistent with Schwam, Greenberg and Li (2021).

Another finding is tied to uncertainties with learning preferences. The comments from participants showed students' inclination toward using multiple preferences. This is supported by the critics of the rigid learning styles, who argue that learning preferences change over time and according to the task (Bruff, 2011; Nancekivell, Shah, & Gelman, 2020).

These findings indicate that participants, who first admitted not having taken part of learning preferences tests, demonstrated a change in the awareness of their learning preferences.

RQ 2. In the centre of the second research question were learners' perceptions of the online learning experience tailored to their learning preferences.
One of the elements of enjoyment indicated in this study was the option to self-pace the learning (a participant explicitly mentions the possibility to choose one's "own natural pace"). The finding is in line with the study referred to in the theoretical background, the research done by Yu (2020), who showed that students ranked the importance of self-paced learning as 2nd in the list of their expectations of an online course.

Availability of multimedia ranked 6th in the list of importance (Yu, 2020) and although not explicitly asked, this seems to be commonly accepted by the participants that the course, which included several sources of materials (text, video, podcast etc) was well tailored. Majority mentioned the different options of learning as a positive addition. Benefits of using multiple representations of materials is supported by Bruff (2011), as well as by Yu (2020).

One of the participants shared their concern with distance-learning, mentioning they would prefer face-to-face interaction to web-lectures, which is in line with findings by Yu (2020).

Results indicate that most participants enjoyed practical tasks and observation. This supports the claim by Simons and Ruijters (2008, p. 249) about the exercising metaphor ("exercising learners did not want to listen, but wanted to try out things themselves") which was confirmed within this study, where both of the participants who were inclined towards exercising said they enjoyed practical tasks and observations best.

Hesitations in connection with the validity of the learning preferences test were expressed and this is supported by the critics of learning styles (Bruff, 2011; Nancekivell, Shah, & Gelman, 2020).

RQ 3. The third research question focused on areas of learning, which were most enhanced in the tailored online course. Here, the aim was to see, if and what areas of learning were enhanced as a result of the intervention. Shearer et al (2020) found that the learning experience itself is an area of focus when talking about personalized online learning and taking ownership of one's learning. This has been confirmed with the present study, where students unanimously agreed they would suggest other students to participate in an online course tailored to their preferences. Predictors of academic success in online courses were discussed by Bradley and colleagues (2018) and in the area of students' self-efficacy and well-being reports by the participants support this, most felt motivated and in charge of their learning process, majority found the course more entertaining and all agreed that their information processing skills were improved. These findings support the emphasis of the policy-makers, like OECD, who in addition to scientific researchers, focus on students' overall well-being. This can be seen in the OECD report *Learning Compass 2030*, where they emphasize the need to activate students' agency, for them to become active participants of the education system and specifically to take responsibility of their own learning and to recognize individual learning paths (OECD, 2019).

An interesting finding that was revealed was that although one could assume that time spent on learning would be reduced if learning took place according to one's preference, evidently about half of the participants (5 out of 11) reported an increase in time spent on learning. This remains disputable, because the participants were not explicitly asked to take note of time spent on the course and this could be affected by any number of factors. Another possible explanation could be that by learning in a preferred manner, students were engaged more and could perceive an increase in the time spent. Poor time-management skills are something discussed by Yu (2020) and in connection with perfectionism, researched by Stoeber and Eismann (as cited in An and Carr, 2017). The latter statement has to be interpreted with caution with regard to findings in this study, but this could possibly be tied to the exercising preference. One of the participants in this study who mentioned that the tasks were time-consuming, reported that exercising (one of the learning preferences prone to practicing) is their first learning preference. This is supported by Stoeber and Eismann (as cited in An and Carr, 2017), who saw that perfectionist musicians, who learn mainly by repetitive practice, spent more time on tasks.

RQ 4. The last research question aimed to find out whether, even under the existing limiting circumstances (e.g. very small sample size; uncontrolled moderating/mediating variables), the adopted intervention would show any tendency with regard to the learning outcomes in any direction. The results need to be interpreted with caution, since evidence shows some changes in either way, but the small sample size means these are insufficient to make any solid conclusions. The data suggests a weak link may exist between improved outcomes for some, but this needs further research.

5   Conclusions

Personalized learning and students' experiences in a tailored online learning setting were under discussion in this study. The data reported appear to support the assumption that students knew little about their learning preferences before the intervention and that the intervention helped them better understand what their preference was. Learners' were assigned to certain learning preference group (metaphor) through the test, however, in actual practice, we could see that they enjoyed having the possibility to access varied learning materials. An online course tailored to students' learning preferences is likely to be perceived as effective, interesting and a useful format of instruction offering a welcomed variety of learning. Participants tend to enjoy the self-paced and personalized nature of learning in particular, the feature that is inherently characteristic to the online instruction. The tailored learning experience might also exert somewhat positive effects on the learning outcomes as well.

In the end, even though tailoring the online experience with the corresponding activities and material can be a very time-consuming effort, the tasks can be easily adapted to next semesters and/or years. The possible benefits discussed within this study certainly outweigh the temporary increase in workload. Overall, it can be said that with due consideration of students' well-being, like providing entertaining content, practical tasks and possibilities to reflect, the experience of a personalized online course will be positive and several areas of learning will be enhanced.

As for the practical implications of the current study, based on the findings, we can say that familiarizing students with learning preferences and engaging them in thinking about their learning by incorporating some form of a learning preferences test into course-work is highly recommended. However, some modifications to the course according to participants comments about the timing should be considered. This is important, so that students would

not feel overwhelmed (especially ones prone to practising, i.e. ones with the exercising learning preference). Few participants reported difficulty in meeting up with peers for groupwork, so providing ample space and time for it should be considered. Sufficient instruction has to be given, to assure comfortable navigation in the course materials, if content tailored to all of the preferences is accessible, including suggestions on time-planning and guidance for groupwork (e.g. role distribution, providing space and time for meetings, etc.).

5.1   Limitations

An overarching limitation of the current study is the sample size. The small sample size has meant that the patterns are vague and the consequent discussion validity can be disputed. Another limitation of this study is the lack of pre-assessment on the comfort of online learning as suggested by Chang et al (2014) and Schwam et al (2021). Although with the current sample, the fact they had previously participated in online learning was determined, in the future, the pre-assessment could be recommended.

5.2   Future research

Future research can be suggested, e.g research conducted with a larger sample could confirm overlaps of the learning preferences (similarities between learning metaphors as discussed by Simons and Ruijters (2008)) and could provide more information about the preferred content (i.e. which multimedia is most preferred). Some other areas for research could include conducting a longitudinal study, spanning across semesters, to see if sustained changes in learning preferences and/or habits become evident. Including moderating variables, such as different age groups (in the professional higher education setting, starting from the 1st year), alternating face-to-face instruction with online sessions or the institution type, could be researched to see if it had impact on the learning experience. Instead of focusing on tailoring content to learners' preferences, tailoring content according to the topic/task, and impacts of these approaches on the learning experiences could be compared.

6   Acknowledgements

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.

Alisa Lepik, *digitally signed*

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Appendices

Appendix A. Descriptions of learning metaphors (Simons & Ruijters, 2008)

Apperception metaphor

The assumption that you can only learn in a peaceful and harmonious atmosphere does not hold true for everyone. Learners who prefer apperception learn well under pressure, saying that they learn best in a hectic, relatively unpredictable and constantly changing work environment. They look for situations that will teach them something. They often have a talent for spotting an expert in a particular field and they learn by example and good observation. These learners are very interested in tales concerning best practice and what works. It is probably obvious that these learners are not exactly keen on situations involving role-play and exercises; they will soon come to regard these as "childish". They prefer to learn in the real world (instead of a learning world) where they are challenged to perform and achieve in a complex environment. Part of the challenge here is to avoid mistakes or to turn a disadvantage into an advantage.

Participation metaphor

People who prefer the participation metaphor learn socially. In the past, learning was often regarded as a solitary process. Increasingly, however, the social side of learning is being emphasized: we learn with and from each other. Knowledge is not an objective concept; everyone has their own interpretation of what it is, but by communicating with others it is possible to arrive at a joint meaning. People who prefer participation learn by interacting and communicating. Interaction is essential for them. They need the cut and trust of discussion to sharpen and clarify their ideas, being forced to explain their thoughts, which, in turn, encourages feedback in the form or reactions and ideas from others. Learning is easiest for these learners within a group where the members are interested in and trust each other. Support in the form of a team coach, someone who can guide the group process, can be useful, but the division of tasks within the group and rotating chairmanship is a good alternative.

Acquisition metaphor

Although many trainers and teachers are trying to find ways to bring theory and practice closer together and to escape the restraints of the classical system, there are people who really prefer this way of learning. They attach great importance to the transfer of knowledge and the learning of skills. They often learn well when goals are set and learning processes are defined. They like

to be taught by "experts", teachers who know their subject matter. After all, knowledge is objective and it is important to gain knowledge in an unsullied environment. For these learners, mistakes should be avoided: making mistakes is a sign of planning errors, sloppy preparation or inadequate knowledge. These learners know what they want to learn and target their learning to achieving a concrete result. Regular testing is part of this learning process; after all, knowledge can be measured. Examination results give a clear indication to what extent the results have been achieved.

Exercising metaphor

Together with "acquisition", "exercising" is perhaps the most well-known learning preference. Time and time again, exercising seeks to bring learning closer to the workplace, choosing forms such as on-the-job training, work experience and role-play. The greatest concern is whether what is learned can be applied in practice. For this reason, wherever possible, training is carried out in realistic situations; situations that reflect everyday practice as closely as possible. The core of this approach is that it is a "learning situation". This means that the environment must feel safe enough to dare making mistakes in it. The environment should also be uncluttered enough not to detract learners from their primary goal. Moreover, it must be peaceful enough to allow learners to reflect on what they have learned. In short, learning as exercising requires a peaceful, safe, not too complex, but realistic environment where learners have the freedom to experiment, ask questions and have the opportunity to reflect. Learning can be supervised by someone from the work environment or an experienced teacher. The important thing is to have someone who can simplify situations, point things out, or pass on things that will bring learners a step closer to their goal. With these learners, mistakes can also be discussed, because mistakes contain a wealth of information that helps learning.

Discovery metaphor

Learning as "discovery" is based on the premise that life and learning are synonymous. We do not just learn during a course; we are always learning. There is no such thing as "not learning". Learning means finding our way through and understanding situations. Being conscious of this, teaches us a great deal about daily life and those unexpected events that confront us all. An important prerequisite is a large degree of freedom. Learners who prefer discovery like to go their own way. This does not necessarily have to be the most efficient path, as long as it is the most interesting one. These learners search for inspiration and meaning and find these in their environment, friends and the people around them. Knowledge is what they themselves

construct. The discovering learner does not really require their learning process to be supervised, but an inspirational teacher or supervisor will be taken seriously. These learners are often recognized by their creative drive and their urge to discover things for themselves. Initially, they can appear to be chaotic, but mistakes are all part of the game promote alertness. If something takes too much time and effort, it will be necessary to try another tack.

Appendix B. Learning preferences instrument

Learning preferences (5)
Mapping the way you learn

Method: This questionnaire contains fifteen questions. All questions are followed by four of five answers. Presume, when answering the questions, an average preference (3). If an answer is (very) appealing to you, choose 4 of 5. If you consider it less pleasant or even annoying choose 4 of 5. If you consider it less pleasant or even annoying, choose 2 or 1. The more extreme your choice, the clearer your learning orientation will be after the test.
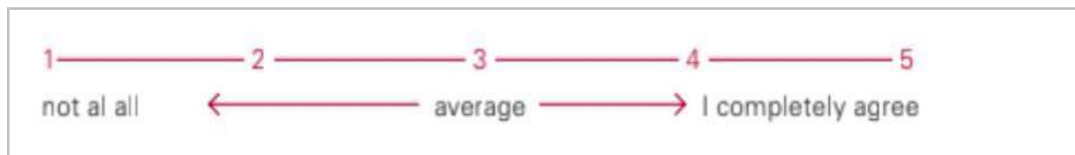
1 = not at all
2 = less than average
3 = average
4 = more than average
5 = I completely agree

	1 to 5
1 Which circumstances help you in your development?	
When there is time and space to practice	
Environments with many sources of knowledge	
Working conditions in which I come across new, interesting questions	
Inspiring meetings with others	
Complex issues that require a quick solution	
2 How do you acquire knowledge?	
By looking for what works	
By talking to others	
By developing learning activities	
By everything I do	
3 Which feelings help you in your development?	
Inspiration, curiosity	

Safety, trust		
Clarity, assurance		
Tension, pressure of work		
4	What irritates you when learning?	
When something is long-winded		
When people withdraw from the team		
When there is ignorance, insufficient knowledge		
When I have to do something I feel unqualified for		
When activities lack freedom		
5	What does collaboration mean for your development?	
In interaction with other people I find it easier to solve problems		
Learning together with other people is more efficient		
Other people help me		
I consider other people a sounding board for my ideas		
6	How do you deal with mistakes?	
I learn a lot from mistakes		
Mistakes keep me alert		
I try to prevent mistakes with a thorough preparation		
I do not learn a lot from mistakes		
7	What do you prefer in education?	
Learning about a practical assignment		
Peer-review		
Trainings and workshops		
Company visits		
Lectures and classes		
8	What or who decides the direction of your development?	
What I come across in my work or outside of my work		
The direction of development of my team		
I plan personal development with a coach, manager or trainer		
I believe that my personal development should contribute to organisational development		
9	How do you organize learning when doing your job?	
I try to discuss it with others		
I read a good book once in a while		
My daily work offers enough issues to learn from		
I consciously practice new behaviour		
10	What is the most important pitfall in your development?	
Taking insufficient time to think		
Taking too much time for reflection		
Finding too many things interesting		

A constant search for the truth		
Being bored too fast		
11	**Who makes you think at work?**	
Experts		
Colleagues		
Critical outsiders		
Could be anyone		
12	**How do you respond to unfamiliar situations?**	
I just plunge into it and see how it goes		
I ask others for advise		
I first do a dry run		
I try to find out as much as I can		
13	**How do you respond to unfamiliar situations?**	
What are features of the ideal supervisor?		
Didactical skills		
Skills in supervising group processes		
Practical experience		
Acuteness		
Professional knowledge		
14	**What kind of knowledge is important to you?**	
Expertise		
Shared views		
Proven knowledge		
Knowledge giving me something to hold onto		
15	**What makes you think?**	
Successful solutions		
Different opinions		
My own actions		
Required knowledge		

Apperception	-45
Participation	-45
Acquisition	-45
Exercising	-45
Discovery	-45
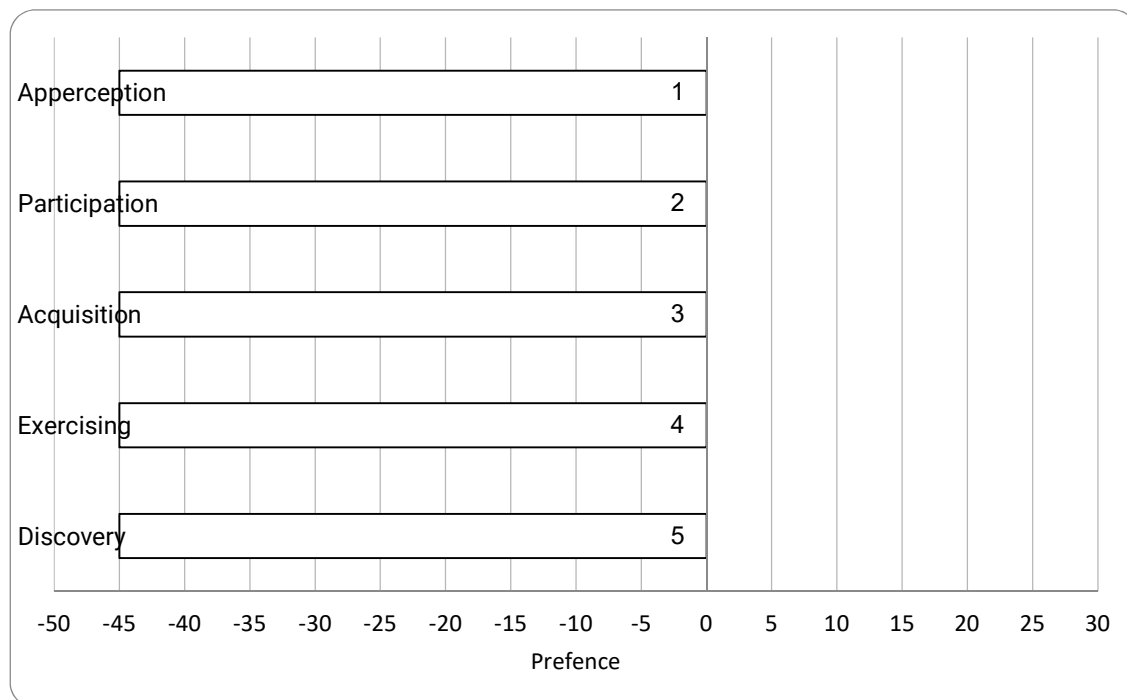
Apperception		1
Participation		2
Acquisition		3
Exercising		4
Discovery		5

-50 -45 -40 -35 -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30

Prefence

Twynstra Gudde *Anders* denken, gewoon doen

Appendix C. Questionnaire on students' perceptions

Individual learning preferences - perceived benefits of tailoring online learning to learner preferences.

You are about to answer a questionnaire which aims to collect data for Alisa Lepik's master's thesis. Its working title is "Individual learning preferences - perceived benefits of tailoring online learning to learner preferences." Now that we have finished the course, we are about to look back at the tailored learning process in general. In the beginning of the semester You took a test determining your learning preferences. The tailored tasks were based on Your first learning preference and You had the opportunity to try out other preferences' tasks as well. With this questionnaire I would like to find out about your perception of the tailored course and what the benefits of such tailoring were.

Background - Learning preferences: Previous experience and current awareness

- *General background: How aware are students about their learning preferences and tailored courses? Which learning preference prevails among the sample group?*

Question/statement	Yes	No
I have previously (before this course) taken a test to determine my learning preferences		

Question/statement	Participation	Acquisition	Exercising	Discovery	Apperception
Which was your first learning preference as suggested by the learning preferences test?					
Which was your second learning preference as suggested by the learning preferences test?					

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
I was very aware of my own learning preferences before this tailored course					
I am more aware of my learning preferences now that I have finished the tailored course					

Question/statement	Yes	No
I have previously (before this course) experienced a tailored approach		

If there is anything you would like to comment concerning your previous knowledge of learning preferences or the gained knowledge of learning preferences, you may do so here:

....
....
....
....

On the perception of a course tailored to the learning preference

- *What are learners' perceptions of the online learning experience tailored to their learning preferences? Perceptions about diagnostic testing.*

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
Taking the test on learning preferences has helped to better understand how I learn best					

Please explain, how has the test changed your perception of how you learn best:

....
....
....
....

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
The learning preference as determined by the test and my own personal preferences coincide					

If you disagreed or strongly disagreed, please, explain why you think your preference did not coincide with the test result:

....
....
....
....

- *What are learners' perceptions of the online learning experience tailored to their learning preferences? Perceptions related to the learning process.*

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
I enjoyed the process of a tailored course					

Specify, what did you enjoy the most and what did you enjoy the least:

....
....
....
....

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
The course layout was easily comprehended; the navigation was in a logical order					

If you disagree or strongly disagree, please, explain what aspects of the course were not easily comprehended:

....
....
....
....

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
The tailored nature of the course was a huge factor of my success in this course					

Explain, what impact did the tailored nature of the course have on your studies:

....
....
....
....

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
Tailored course is something I would like to experience in the future					

How would you like the course to be tailored (in a similar fashion as this one or you have some other suggestions)?

....
....
....
....

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
In the future, if I had a choice, I would choose a tailored course over a "regular" course					

Why would you choose a tailored course over a "regular" course?/Why not?

....
....
....
....

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
In the future, if a lecturer would tailor a course, I would prefer the course to be tailored to the first learning preference only					
In the future, if a lecturer would tailor a course, I would also like to be able to access tasks catering to other learning preferences besides my first learning preference					

Please, specify why would you either prefer a single learning preference or gain access to materials prepared according to different learning preferences:

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....
....
....

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Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
If attending a regular course in the future, I will still try to complement the learning process with activities in line with my learning preference					

Please specify, what actions will you take when attending regular courses (e.g. discovery type will ask the professor for more self-regulated tasks; participation type will meet more with fellow students to discuss studies; exercising type will focus more on practice):

....
....
....
....

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Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
The gained knowledge of my learning preferences will affect my future studies in a positive way					

Please specify, in what ways will the gained knowledge affect your future studies (what is going to change for you?)

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....
....
....

Question/statement	Yes	No
I will recommend this experience of a tailored course to other students		

Please, specify why/why not?

....
....
....
....

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On enhancing the learning experience with a course tailored to learning preferences

- *Which areas of learning will be enhanced according to learners' experience in an online setting by tailoring a course to accommodate students´ learning preference. In the following statements compare a "regular" course to tailored course.*

Question/statement	Strongly agree	Agree	Somewhat agree	Disagree	Strongly disagree
The tailored course was easier to follow					
The tailored course was more entertaining					
I felt more motivated during the tailored course					
I felt very much in charge of the learning process					
The tailored course reduced the learning time					
The tailored tasks were easy to complete					
The tailored tasks made me reflect more on my learning process (I thought more about, what would be the best way for me to learn)					
The tailored tasks improved my information processing skills (I was able to locate and collect relevant information)					
The tailored tasks helped me see the connection between theory and practice					
The tailored course made the process of achieving the learning objectives better					

The knowledge gained in the tailored course reinforced my understanding of the subject					

Please specify, which other areas of learning do you feel were enhanced:

....
....
....
....

Thank you for your contribution!

Any last comments about the online course tailored to your learning preference are highly appreciated!

....
....
....
....

Appendix D. Results from the Questionnaire on students' perceptions

The results analytics can be seen by copy-pasting the following link into a separate browser window:

https://docs.google.com/forms/d/1ton0DDRJcs91Zz6Vd0B8-H0eYzyhnPAHQIQ3OUI28EA/viewanalytics

Note that participants pseudonyms were assigned only after the Microsoft Excel spreadsheet was downloaded, the pseudonyms follow the logic that the first entry is Participant 1, next is Participant 2 etc. When viewed in the analytics page (the link above) comments are presented in the same order.

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INDIVIDUAL LEARNING PREFERENCES - PERCEIVED BENEFITS OF TAILORING ONLINE LEARNING TO LEARNER PREFERENCES IN PROFESSIONAL HIGHER EDUCATION

supervised by Natalia Edisherashvili.

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Alisa Lepik
01/06/2022