

University of Tartu
Faculty of Social Sciences
Institute of Education
Curriculum of Educational Technology

Hanna Yaremenko

THE UNCERTAINTIES OF DIGITAL LEARNING GAMES USE IN TEACHING
YOUNG CHILDREN (BY THE IMMERSION METHOD): THE CASE OF ALPA KIDS

MA thesis

Supervisor: Associate Professor of Educational Technology, Emanuele Bardone

Tartu, 2023

Abstract

The aim of the thesis is to explore the uncertainties surrounding the use of digital learning games in teaching young children, with a focus on ALPA Kids. The research problem addresses the challenges faced by Ukrainian children in Estonian schools and the need for effective tools to support their learning process. The objective is to reflect on the experience of using ALPA Kids in teaching Ukrainian students and investigate its impact on learning outcomes. An autoethnographic approach is employed to analyze personal experiences. The findings demonstrate that ALPA Kids enhances the learning process, facilitates language acquisition, supports personalized learning, and promotes collaboration between teachers and parents. Further research is recommended to address uncertainties and optimize the implementation of digital learning games in primary education.

Keywords: digital learning games, ALPA Kids, uncertainties, young children, language acquisition.

Table of Contents

Abstract	2
Introduction	4
Theoretical overview	6
Defining uncertainty	6
Uncertainty in the teaching profession	7
Digital learning games in primary education.....	8
Uncertainties in digital-games use	10
Opportunities and doubts of ALPA Kids application use	11
Method.....	13
Before the study.....	13
The study design	14
Participants	15
Data collection	15
Data analysis.....	15
Quality Control	16
Research ethics	16
Results	17
Uncertainties related to ALPA Kids application as a learning tool.....	17
Uncertainties related to personalization and the learning pace	18
Uncertainties regarding the use of ALPA Kids for teaching immigrants school subjects ...	21
Uncertainties regarding the collaboration between teachers and parents	24
Discussion	26
Conclusion.....	30
References	31
Acknowledgements	34

Introduction

Since the beginning of the war in Ukraine, a total of 8.1 million Ukrainian refugees have crossed the border into the European Union countries to seek protection and safety from the Russian invasion. According to the information given by Police and Border Guard Department, since the end of February 2022, Estonia has received more than 67,000 Ukrainian military refugees. Among them were me and my family.

As is stated in the report of the Riigikogu Development Monitoring Centre "Ukrainian children in Estonian education", as of mid-February, 8,463 children from Ukraine, or an average of 3 percent of all Estonian schoolchildren, are enrolled in Estonian schools (Kindsiko, 2023). The largest number of Ukrainian schoolchildren is in Harjuma, where the children of Ukrainian military refugees account for 4 percent. Almost half, or 45.5 percent, of Ukrainian children in Estonia study in Tallinn. 63% of Ukrainian children study in Estonian by language immersion method. The experience of teachers and school administrators shows that it is easier to integrate children in pre-school education, i.e. young children. The more complex the content of the subject, the more difficult it is to participate in education without knowledge of the Estonian language at the primary level.

Taking into account the above, the administration of Vanalinna Hariduskollegium decided to open the first Ukrainian class. From 1 September 2022, 15 pupils were enrolled and two teachers: the Estonian one and the Ukrainian (me), started to teach them. Despite the fact, both of us are experienced primary-school teachers, our task was quite challenging for these reasons:

- children had different levels of school readiness, some were 6 years old and not ready for school and some had already finished the 1st form in Ukraine
- all children have got traumatic experience
- some students leave, and some new ones come
- students have to be taught all subjects in Estonian and learn English but 73 percent could not read and write in their native language.

Together with my colleague, we started looking for ways to support the learning process, to make it less stressful for students, to enhance students' motivation and at the same time to reach educational goals. We stopped our choice on ALPA Kids e-learning games – age-appropriate learning games with 4 difficulty levels (ages 3-8), developed together with school and preschool teachers, speech therapists, child psychologists, and top researchers in child development. The games are outlined for ECE curriculums: Mathematics, Language,

Environment, Memory & Logic, are based on local culture and nature and could be used both at home and in educational institutions to diversify learning and make it more efficient. Home users can use ALPA on both Android and iOS devices, for educational institutions a web version for computers and smart boards is available.

While digital learning games have the potential to serve as an ideal platform for education due to their ability to generate high levels of engagement and motivation, several factors, such as the ambiguous nature of teaching, the way we perceive learning, and the presence of uncertainties, make their implementation complex. Various themes that require further investigation include the effectiveness of the ALPA Kids learning tool, the degree of personalization and learning pace, the integration of the tool into different school subjects, and the collaboration with students' parents.

This thesis aims to explore uncertainties and reflect on the experience of using ALPA Kids digital learning games in teaching 1st-year students from Ukraine in the Estonian education system. Reflecting on personal experiences is an essential and practical aspect of this approach. Despite having a remarkable background in on-site and online teaching, which included gamification practices, the new circumstances and conditions introduced heightened uncertainty in selecting appropriate tools.

The results of the study can provide valuable insights into the impact of using digital learning games on primary school children's effectiveness and motivation to learn in a language other than native. The exploration of the various themes and uncertainties related to the implementation of such tools is crucial for educators and policymakers to make informed decisions about the integration of technology in education. Furthermore, the research highlights the importance of reflecting on personal experiences to improve teaching practices and enhance student learning outcomes. This might contribute to the development of effective and engaging teaching methods that can be adapted to different cultural contexts and educational settings.

Theoretical overview

Defining uncertainty

Life is filled with uncertainty and doubts about future events. American mathematician and Temple University professor John Allen Paulos (2007) stated that „uncertainty is the only certainty there is, and knowing how to live with insecurity is the only security“. Although people may not have control over certain circumstances, their mindset plays a crucial role in managing challenging situations and facing the unknown with confidence.

So, what does uncertainty mean? Uncertainty can be defined as a state of lacking assurance or certainty about someone or something, ranging from a partial absence of conviction to a complete absence of knowledge regarding a specific outcome (Merriam-Webster, n.d.). It is common for individuals to experience uncertainty when they are presented with various options and lack control over the outcome. However, uncertainty should not be solely viewed as a negative emotion associated with a sense of dread about the future. Rather, uncertainty is a fundamental aspect of human existence that is considered normal and expected (Coles, 2013; Nowotny, 2015). According to Macmillan (n.d., Definition 1a), uncertainty arises when something remains unknown or has yet to be determined, signifying an opportunity for exploring new ways of thinking and learning. This suggests that uncertainty can encourage innovation (Nowotny, 2015) by prompting inquiry, reflection, and change (Wheatley, 2002).

In certain circumstances, attempting to create certainty may not always be effective. Although we may have an innate inclination to resist uncertainty, attempts to predict the future could also lead to stress, so learning to live with ambiguity becomes crucial, especially in situations such as the pandemic and wars, which has significantly disrupted daily routines and upended carefully planned objectives. In ‘Raising the teacher's voice and the ironic role of theory’, McDonald (1986) asks, “what if theorists recognised that intimate knowledge of this uncertainty was exactly what was missing from both their theories and the policies these theories provoke?” (p. 362). This thought entertains the notion that uncertainty is not simply a feeling that should be avoided, but rather embraced as a potential space for growth.

Moreover, in a world where uncertainty is pervasive, it seems unlikely that there could be only one correct outcome. Fromm argues that the pursuit of certainty can hinder the search for meaning and that uncertainty can drive individuals to explore their potential. According to Fromm (as cited in Jordan et al., 2014), creativity requires individuals to relinquish their

certainty and embrace uncertainty. Uncertainty, therefore, leads to diversity and suggests that there are many possibilities and options rather than only one way of doing things

Uncertainty in the teaching profession

Teaching has always been and will continue to be infused with multiple uncertainties, which create a sense of tension for teachers. This tension arises due to the unpredictable nature of the teaching profession and the constantly evolving needs of students, which demand teachers to be adaptable and flexible in their approach. Gadd and Rosliakova (2022) in their research point out:

Uncertainty can be a highly emotional state, though not necessarily something that should be reduced or avoided. Uncertainty can be embraced as an opportunity for growth, creativity, and reflection. Teachers are caring people; it makes sense that fear, anxiety, and stress are encountered in new contexts.

Several scholars, such as Floden and Buchmann (1993), Helsing (2007a), and Labaree (2000), have emphasized that the work of a teacher is inherently uncertain. In our days, when information is easily accessible, and the job market is unpredictable, uncertainty has become an integral part of teaching. It is not just an inevitable aspect but also something that teachers must learn to live with (Labaree, 2000). As Barnett (2007) points out, a pedagogy for uncertain times must be uncertain itself, and teaching for an uncertain age requires openness, risk-taking, and unpredictability. Therefore, it is essential for teachers to embrace uncertainty and learn to navigate through it, as they strive to educate and prepare students for a rapidly changing world.

Teaching has become increasingly complex, particularly with the rapid shift to emergency online teaching, which has been exacerbated by uncertainties. According to Eradze et al. (2021), although educational technologies were widely available before Covid-19, they did not have the anticipated innovative or educational impact. However, the pandemic prompted teachers to reconfigure their pedagogy abruptly, incorporating online tools. Bozkurt et al. (2020) emphasize that the pandemic has created a period of uncertainty and anxiety for learners, teachers, and parents, prompting the emergence of a pedagogy of care in educational institutions. This approach prioritizes supporting students' emotional and mental well-being alongside their academic learning, recognizing the significant impact of the pandemic on their lives. A study by Eradze, Bardone, and Dipace (2021), refers to unorganised variety as contributing to uncertainty. In this context, “unorganised variety refers to the fact that teachers

and other educational actors could entertain options that they could have never contemplated without the suspension of all in class activities” (p. 409).

Teaching is inevitably characterized by uncertainty, and it is important for teachers to embrace this fact and view uncertainty positively. Flexibility, openness, and a willingness to question one's approaches are key to success in teaching. When teachers allow themselves to acknowledge uncertainty and reduce their sense of certainty, they open themselves up to more options and opportunities for experimentation and innovation in their teaching practices. A positive attitude towards uncertainty can also motivate teachers in their careers and help them to find joy in the surprises that come with their daily work. Similarly, in the context of technology use in education, the feeling of uncertainty is a common and important aspect of redesigning traditional courses for online formats. Pirk in her autoethnographic study (2020) concludes:

Every teacher’s experience with uncertainty, concept and response to it will have a high level of granularity. Resolving uncertainty sets in motion the flowing of new opportunities, views, practices and learning new skills.

Therefore, teachers should embrace uncertainty as an opportunity for growth and development in their teaching practices.

Digital learning games in primary education

A brief definition of digital games entails their description as a wide variety of digital applications characterized by some common elements: the gaming environment, the strong participation of the gamer, the element of interactivity, and an increased use of multimedia (Carr et al., 2006). According to Prensky (2001):

A game can be defined as digital based on six characteristics leading to the gamer’s involvement (when combined). These are the following characteristics:

- The rules of the game.
- The aims of the game.
- The result and its feedback.
- The element of conflict/competition/challenge/rivalry.
- The element of interaction.
- The representation of a story or plot.

Digital educational games have proven to be highly beneficial and effective tools for education, as they offer an alternative approach to presenting educational content. Common Sense Media, an educational organization, shares the view that well-designed educational

games do not serve as distractions for students. Instead, they can serve as supportive channels for various learning and teaching practices. Furthermore, these games have the potential to motivate students regardless of their gender, age, or educational level. They also provide a suitable environment for different learning groups to collaborate and work towards common learning objectives. Moreover, educational games can assist teachers in their efforts to instruct diverse types of students (Hetzner et al., 2011).

Undoubtedly, learning occurs while engaging in computer games. The challenges presented in games require a range of skills, such as IT proficiency, literacy, numeracy, hand-eye coordination, strategic thinking, cognitive abilities, and many others (Clark, 2003). A study conducted by Coventry University, led by Mrs. Beverly Plester and Dr. Clare Wood, examined the connection between texting and literacy skills. Their findings indicated that individuals who engage in regular texting exhibit strong literacy abilities. Contrary to the notion that texting negatively affects spelling, reading, and writing skills, the study revealed a positive correlation between texting and proficient use of the English language. (Wood et al., 2013).

Numeracy skills are also essential in comprehending the various scoring mechanisms used in games. Games often involve a strong understanding of numbers, addition, subtraction, measurement, approximation, and variables, particularly due to their sophisticated scoring and rating systems. Communication skills are also developed through the diverse forms of verbal and electronic social interactions associated with games. The field of education and training is currently facing a motivational crisis, with significant disengagement from learning both in schools and workplaces. However, games have proven to be effective motivators. Games frequently provide players with a sense of personal progress and achievement by reaching specific states or goals. They allow users to earn rewards and customize their avatars, environments, or experiences, contributing to a user-centered and engaging learning experience. Real-time feedback is a common feature of games, and players engage in extensive practice and reinforcement by playing and replaying games for extended periods, sometimes spanning weeks or months. The strong motivational appeal of games increases the likelihood of players returning for more, which is not typically observed in traditional training and education settings (Clark, 2003).

Uncertainties in digital-games use

While digital games are experiencing rapid growth and are widely recognized as a highly popular form of entertainment for children, they also serve as dynamic tools for enhancing students' cognitive abilities and motivating their learning. However, incorporating digital games into primary school classrooms can present uncertainties and challenges for teachers. It is crucial for educators to acknowledge these challenges and have access to the appropriate resources and support to successfully integrate digital games into their teaching methods (Manesis, 2020).

It is important to highlight that uncertainties exist regarding the effectiveness of digital educational games for learning purposes. One such uncertainty revolves around the lack of consensus regarding the factors that influence the effectiveness of Digital Game-Based Learning. Consequently, there is a need for more advanced assessment models that can consider a wider range of direct and indirect factors, as well as their interactions. (Fokides et al., 2019).

Manesis in Digital games in primary education (2020) claims:

Besides, the use of digital educational games in a class of primary school demands the teacher's attention on the content, structure, and design parameters. At this point, the teacher plays an important role in order to ensure the quality of learning and the participation of learners. Apart from it being essential, the teacher's role entails also creativity since he is expected to include game-based learning in his teaching techniques. This occurs due to the fact that all primary school curricula do not contain detailed instructions for the appropriate use of digital educational games.

Certain teachers hold the belief that new technologies alone cannot guarantee effective learning and emphasize the importance of proper educational design based on fundamental learning principles. Consequently, there remains a percentage of teachers who are skeptical about using digital educational games as teaching and learning tools. The literature identifies two types of barriers faced by teachers, which can limit the successful implementation of digital educational games in the classroom.

Firstly, external barriers include constraints such as limited time, inadequate training, insufficient funding, and restricted access. It is challenging for teachers to incorporate digital educational games within a limited timeframe, particularly when they lack the necessary support, access to technology, and sufficient training. The lack of time, motivation, and

support further discourages teachers from engaging with Digital Game-Based Learning (Manesis, 2020).

Secondly, internal barriers arise from personal beliefs and attitudes of teachers, such as negative perceptions toward digital educational games, lack of interest, and a lack of confidence in utilizing these games as effective instructional tools (Manesis, 2020). These internal factors can contribute to the exclusion of computer games from the classroom.

Opportunities and doubts of ALPA Kids application use

Kelly Lilles (2020), one of the co-creators of ALPA kids, discussed the concept and implementation of the educational application. The development of ALPA kids involved a collaborative effort among educational technologists, kindergarten and preschool teachers, researchers, and psychologists. Each stage of the application's creation incorporated the contributions and insights of these individuals, ensuring a coherent and interconnected progression.

ALPA kids offers four difficulty levels tailored to students' knowledge and age. Each difficulty level covers various categories or topics, including alphabet, numbers, math, nature, puzzles, poetry, objects, and shapes. The design and construction of the application aim to facilitate children's learning in different subjects and enable them to apply their vocabulary knowledge. It achieves this through friendly and positive feedback, visual elements (such as animations featuring the Alpa character appearing and disappearing as needed), and sound effects. The application is designed for both online and offline use (Lilles, 2020).

ALPA kids prioritizes the provision of high-quality digital educational content in the Estonian language. As highlighted by Stahl (2020), ALPA actively participated in a co-creation program in partnership with HITSA (Information Technology Foundation for Education) and Tallinn University. The objective was to develop a top-notch digital solution specifically for Estonian education, ensuring that students have the opportunity to acquire knowledge and engage with scientific concepts in their native language. Additionally, the aim was to make this solution easily accessible to anyone interested in utilizing it.

As was mentioned in The best research paper at Tallinn University: pedagogical analysis of ALPA Kids games, research leader Janika Leoste (Selgusid Tallinna Selle Aasta Parimad Ettevõtlusteed, 2021):

As part of the cooperation project, Tallinn University researchers gave a pedagogical assessment to the games in the ALPA Kids application, which helps develop the concept of a personalized digital learning path. The updated application allows preschool children

to acquire knowledge based on play and greatly simplifies distance learning in primary education.

Cooperation with Tallinn University has increased the credibility of ALPA digital learning games and increased their distribution among teachers. ALPA won the people's favorite Keeleteo award given by the Ministry of Education and Research in 2021, and in 2022 the award "With children and for children", which are awarded by the Office of the President of the Republic, the Office of the Chancellor of Justice and partners. ALPA games in Estonian have a total of over 65,000 users. Among them, more than 350 educational institutions. ALPA also cooperates with several preschools and schools to get feedback, new ideas and to develop the game further (ALPA Kids, s.a.).

ALPA team helps Ukrainian children in Estonian schools children continue their education and integrate into the Estonian education system. More than one hundred Estonian educational institutions that have accepted refugees from Ukraine have the opportunity to use digital educational games as a teaching tool for free for a year. "The mobile application has a special speech delay for children with a different home language, which slows down the speech in the application - thus you can learn Estonian more easily," mentioned Kelly Lilles in an interview to Estonian Teachers' Magazine (2022). Kaarel Rundu, a school principal added: "There are not so many digital educational materials that are age appropriate, relevant and suitable for Ukrainian children, but ALPA games have helped both children and teachers a lot" (2022).

The theoretical overview highlights the promising potential of digital games, including the ALPA Kids application, in primary education, particularly for language acquisition. However, its implementation in the learning process also brings forth concerns and areas of uncertainty. This autoethnographic research aims to address these uncertainties and explore the efficacy of digital learning games, focusing specifically on ALPA Kids. To shed light on these uncertainties, the following research questions were formulated:

RQ1 What are the uncertainties related to ALPA Kids application as a learning tool?

RQ2 What are the uncertainties related to personalisation and learning pace?

RQ3 What are the uncertainties regarding the use of ALPA Kids for teaching immigrants school subjects?

RQ4 What are the uncertainties regarding the collaboration between teachers and parents?

Method

As outlined in the introduction, the goal of this research is to investigate the different uncertainties that exist when educators use digital learning games in primary school children's education. Qualitative research methods were used in this study, including the techniques of interviewing, observation, and document analysis, as this research aims to explore the behaviour, processes of interaction, and the meanings, values and experiences of purposefully sampled individuals and groups in their “natural” context (Liamputtong P, Ezzy D, 2005).

We deemed qualitative research methods as the most appropriate as our research question looks into personal uncertainties we face when working in the classroom, integrating new technologies. This study employed a qualitative research design using autoethnography, field notes, and semi-structured interview study elements. Fieldnotes allows to capture not only observations, but also asides, commentaries, and in-process memos (Emerson, Fretz, & Shaw, 2011). In addition to enriching our eventual research findings, interviews also provide a mechanism of quality control in our research design (Cooper, R., & Lilyea, B. V, 2022). We will describe the studies, course design, and research methods further throughout this chapter.

Before the study

On 01.09.2023 an Estonian school opened the 1st class for Ukrainian children and two teachers were assigned to work with the children. Estonian curriculum was taken as a base and the school administration made the decision not to change it just add one more lesson of the Ukrainian language and teach children by immersion method. However, the task proved to be challenging for the two teachers assigned to the class, as the students exhibited various educational and social needs. Among the 15 students, three had not attended kindergarten and were six years old, four had studied in the first grade in Ukraine, and all had experienced trauma and socialization problems. The school has garnered a reputation for its innovative and individualized approach to education, which leverages technology to enhance student motivation and achieve exceptional results in foreign language acquisition. Given this context, the idea to integrate digital learning games with the teachers' expertise emerged as a promising approach to address the challenges posed by the Ukrainian class.

Shortly before the beginning of the school year ALPA Kids company made the proposition of free access to e-learning games for Ukrainian classes and provided seminars for teachers. The application has many advantages: the games are outlined for ECE curriculums

in Mathematics, Language, Environment, Memory & Logic, could be downloaded to mobile phones, tablets and a web version for computers and smart boards is available. Free access for Ukrainians allowed the use of apps for homework and distance learning. However, uncertainties concerning the learning pace, the adoption of the application in other subjects, the relationship with parents, and the efficacy of its use arose. In Estonia, the application was mainly used in kindergartens and preschool classes, and it had not been used in an immersion learning setting. All of the above gave rise to research aimed to provide insights into the impact of using digital learning games and Alpa Kids in particular.

The study design

For this study autoethnography was chosen as the most appropriate research method as the focus is explicitly on uncertainties of the use of digital learning games in the author's own practice. Cooper & Lilyea „I'm Interested in Autoethnography, but How Do I Do It?“ (2022) write:

Autoethnography fills a gap in traditional research where the researcher's own voice typically is not overtly included as part of the research. As you develop your autoethnography, it is key to keep in mind that the base unit of analysis is you, the author, and the researcher. (p.4)

Autoethnographic techniques typically involve the researcher reflecting on their own experiences, feelings, and reactions in relation to a particular culture or phenomenon. This can involve keeping a journal or diary of personal experiences, conducting interviews with oneself, and engaging in self-reflection exercises such as free-writing or visualization. The research question, reflecting the focus of autoethnography – the experience of using the digital learning games ALPA Kids and their impact on Ukrainian children in the primary school setting - was formulated.

Autoethnographic research can be particularly useful for exploring complex or sensitive topics that may be difficult to access through traditional ethnographic methods. It can also provide insights into the subjective experiences of individuals within a particular cultural context, which can be valuable for developing more nuanced and empathetic understandings of diverse perspectives (Ellis, Adams, Bochner, 2011).

Observations and self-observations were conducted and ethnographic field notes and jottings were taken on our own observations. Besides the semi-structured interview with a co-teacher was planned.

Participants

The 15 students of the 1st Ukrainian class, aged 6-8 years, were observed 5 days a week during the usage of ALPA Kids learning games on Mathematics, the Estonian language and Nature. The sample is appropriate for reaching the objectives of the research – it enables highlights the importance of reflecting on personal experiences to improve teaching practices and enhance student learning outcomes.

Data collection

The author used a wide range of data collection sources and situations:

- to document the experiences and observations derived from the involvement in the context being studied descriptive field notes were taken during 3 months (December-February). Besides participant-observation, self-observation when the author observed her own behaviors and documented her thoughts while living them. The notes were taken every time the ALPA Kids games were used in the lesson and included detailed descriptions of the games used, students' reactions, conversations, as well as the researcher's own feelings and conclusions. This allowed us to gain insights into the impact of the digital learning games on the children's learning outcomes and socialization skills and to reflect on uncertainties
 - co-teacher's oral comments after using the games on the lesson were included.
 - individual semi-structured interview with co-teacher.

When data were collected in the form of field notes, and interviews they were prepared for analysis which involved recording and transcribing interviews or recorded reflections.

Data analysis

Qualitative research analysis was done by reading data several times and conducting an analysis each time. The use of narrative inquiry and autoethnography techniques were considered for the analysis of the study. As noted by Bochner and Ellis (2016), by using these techniques the researchers could pay attention to their own storytelling and convey their own voices in interpreting the data. This approach allowed for a more nuanced and comprehensive understanding of the impact of the digital learning games on children's learning outcomes and socialization skills.

The autoethnographic story is presented in the results section.

Quality Control

As noted above, different data sources were used in the study, which improves the validity and reliability of research findings. In addition to enriching eventual research findings, triangulation as a research technique provided a mechanism of quality control in the research design. Thus interviewing a co-teacher about her insights into digital games' impact on students' learning provided a more complete understanding of the topic.

Research ethics

The research design involves a focus on the findings and impressions of the author. Nevertheless, it involves other participants and to protect their rights and welfare ethical issues were taken into consideration. The research was conducted an ethical and responsible manner. Informed verbal consent from students` parents and a co-teacher to participate in the study was obtained. Before obtaining consent participants were provided orally with information about the study, including its purpose and procedures. Voluntary participation was explained. To protect the privacy of participants their identities kept confidential.

Results

Uncertainties related to ALPA Kids application as a learning tool

Over the past five years, my focus of research has been on the integration of gamification into the learning process. Therefore, when I learned that I would be teaching first-graders, I immediately began searching for a suitable tool to motivate and facilitate learning for young children. The chosen tool had to meet several requirements: it had to be appropriate for their age, usable in both classroom and distance learning settings, compatible with smartphones and capable of on-screen demonstration, aligned with the Estonian curriculum, and accessible for international students. As I had only been living in Estonia for five months and had limited knowledge of the national curriculum and the digital tools typically used by Estonian teachers, I had to rely on the opinions of my colleagues. However, they were unfamiliar with the specific needs of Ukrainian students and were uncertain about the effectiveness of an immersion-based learning approach. Thus, the selection of the ALPA Kids application posed a significant uncertainty.

After choosing the app, we encountered additional challenges related to technology availability and technical issues. Our classroom lacked tablets or a smartboard, leaving the teacher's laptop as the sole device to support the use of digital games in class. We also needed to consider how students would access the app from home during distance learning. One advantage of ALPA Kids was that it offered free access for Ukrainian students and could be installed on smartphones. We organized a meeting with the students' parents, explained our intentions and how we planned to use the application, and requested them to install it on their smartphones. Fortunately, we managed to acquire six additional devices, which allowed us to use the app in class with small groups or on an individual basis.

Technical issues, including connectivity problems, software glitches, and device malfunctions, became another source of concern. We anticipated that such issues could arise and disrupt the flow of the lesson, so we were prepared to troubleshoot these problems promptly and efficiently. However, one unexpected challenge arose when we discovered that most tasks in the app required the use of headphones. The application itself was quite noisy, with captivating sounds in the games. While the sounds enhanced the gameplay experience, the application usage itself could function without background audio. During a math class where we first introduced the app, the students were doing a Shapes game and it resembled a lively bird concert.

Through these experiences, it became evident that uncertainties and challenges could arise when integrating technology, such as the ALPA Kids app, into the learning process. Adapting to technological limitations, addressing connectivity issues, and managing unexpected requirements, such as the need for headphones, required flexibility and quick problem-solving. Reflecting on these challenges and finding appropriate solutions contributes to the development of effective teaching methods, particularly in diverse cultural and educational contexts.

Uncertainties related to personalization and the learning pace

The collective experiences of both our fellow teachers and our own observations have consistently demonstrated that ALPA Kids is an engaging and enjoyable learning tool that effectively combines educational content with a game-like experience. The app incorporates visual elements, animations, and sound effects to provide positive feedback, fostering a sense of happiness and motivation among children, encouraging them to further explore and play. However, a critical question that arose was whether children were genuinely learning through the app and, if so, how the progress of each child could be effectively measured.

ALPA Kids offers four difficulty levels of games, accompanied by a character that praises the child upon completing a game. Theoretically, each child can select the appropriate level of gameplay based on their individual abilities and knowledge. As we integrated the games into our classroom practices, we found it necessary to carefully choose the level of games we wanted our students to engage with. We rarely utilized the first level, as it was not age-appropriate for our students, and the second level, designed for preschoolers, did not align with the first-grade curriculum. Consequently, our options primarily revolved around the third and fourth levels, while reserving other games for home use. It should be noted that the complexity levels remain consistent within a given topic, and different topics are covered at varying levels. For instance, several mathematics topics specific to the first grade were exclusively available on the fourth level. One such topic was "Time", where the colors of the clock hands corresponded to hours and minutes, facilitating young learners' comprehension (Figure 1). Interestingly, even the stronger learners found this particular game challenging. Some students resorted to trial and error by randomly adjusting the clock hands until they guessed the correct position.

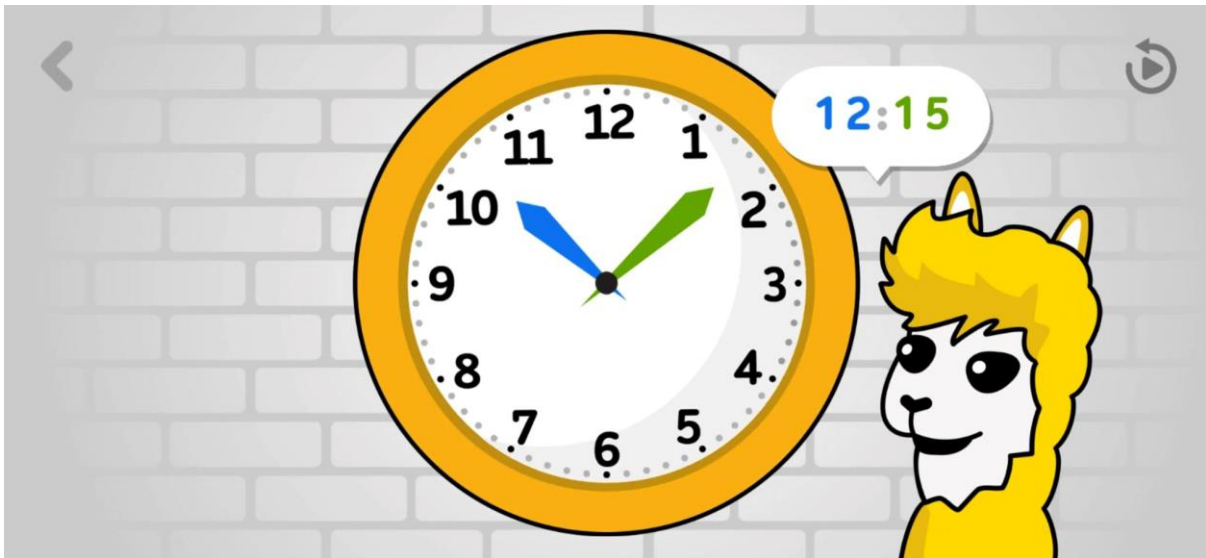


Figure 1: KANA kellamäng (est.) CHICKEN clock game. Move the hands of the clock according to the time of day

At the onset of each game within ALPA Kids, the character provides vocal instructions to guide students on what to do. Moreover, the application offers the option to replay the task explanation if students did not initially comprehend it. In the initial stages of incorporating the games into our lessons, many students did not utilize this repeat option. Instead, they resorted to randomly clicking on different objects until they stumbled upon the correct one (Figure 2). However, as time progressed, the students gradually developed the ability to actively listen and comprehend the instructions, enabling them to successfully complete tasks and surpass their previous best results (Figure 3).

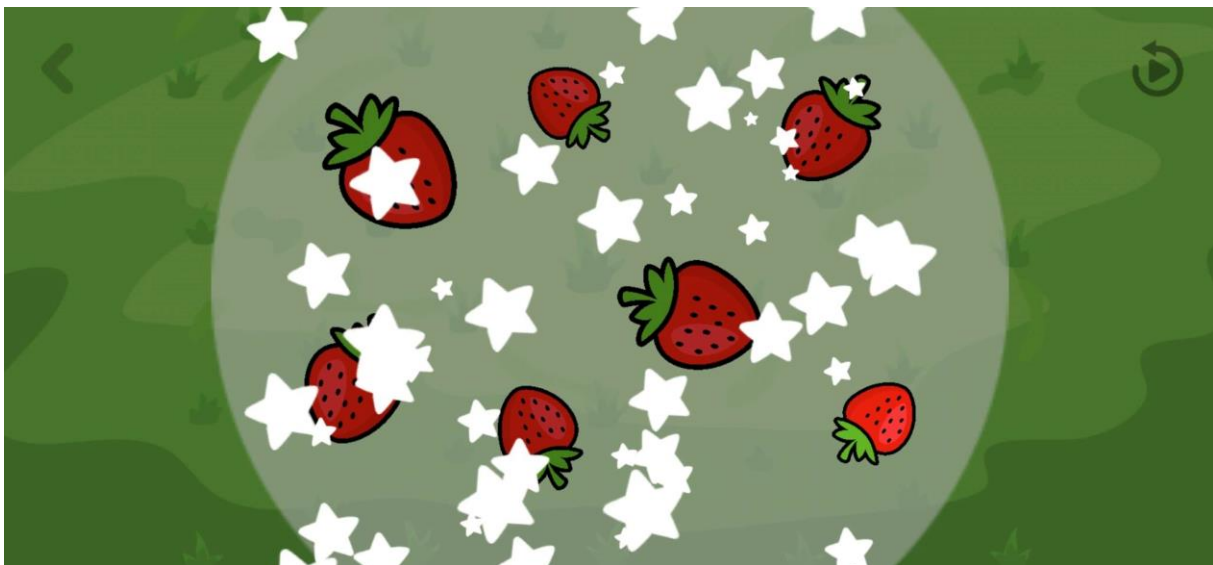


Figure 2: ALPA kids ending of the size game - stars appear on the screen after the correct choice was made



Figure 3. ALPA kids ending of the challenge - balloons appear on the screen with the voice appraisal - “ Tubli” (est.) “Well done”. The child`s best result could be seen on the screen

The absence of a comparative element among students' results within ALPA Kids piques the interest of those who may not typically be inclined towards learning. The provision of individual feedback and praise upon completing tasks or challenges generates a significant amount of positivity, fostering confidence and elevating self-esteem among the children. Consequently, their listening skills are improved, and they develop the ability to concentrate and remain engaged throughout the learning process.

Among the various individualized learning games offered by ALPA Kids, one that we found particularly effective was the "Handwriting Technique" (Figure 4). This game involved practicing letter formation on tablets using their fingers instead of traditional writing tools. Following this digital practice, the students were then tasked with reproducing the same letters in their workbooks. This technique proved highly beneficial for memorizing graphic images effectively. Notably, two girls with previously poor handwriting skills benefitted significantly from this exercise. They realized that attentiveness and adherence to the arrow hints were crucial for success. Consequently, they successfully completed all the tasks, and their satisfaction was evident. In comparison to their usual struggles when completing similar tasks in their notebooks, the use of the "Handwriting Technique" within ALPA Kids proved to be a valuable tool for enhancing their handwriting abilities.

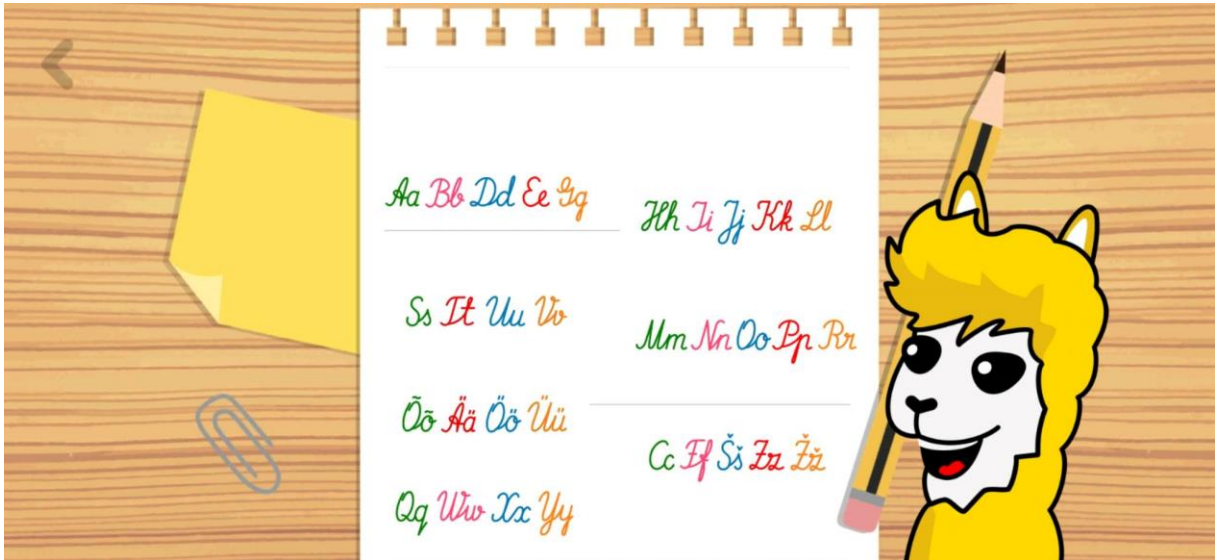


Figure 4. Handwriting technique

However, we encountered certain challenges with the "Handwriting Technique" game. If students inadvertently went outside the designated borders while writing, they were required to restart the task from the beginning. This particular aspect proved frustrating and demotivating for some children. Additionally, an issue arose concerning the grouping of letters for practice. The game only allowed for practicing letters in groups of four, meaning that if a student wished to focus on a specific letter that happened to be the last within the group, they were obliged to complete the preceding three letters as well. As a result, this requirement could be time-consuming and potentially hinder the efficient utilization of the game.

Uncertainties regarding the use of ALPA Kids for teaching immigrants school subjects

Ensuring that digital games align with the curriculum and learning objectives can pose a challenge, particularly when attempting to identify age-appropriate games that specifically address desired learning outcomes. Since the format of using the application was not the usual -1 grade instead of preschool and children who had never studied (or even heard) Estonian before, the possibility of successfully using Alpa Kids for teaching the main subjects in Estonian raised some doubts.

Despite these concerns, we introduced the application as a supplementary teaching tool for Mathematics, Estonian, and Nature. During the initial implementation, we observed that students displayed a notable affinity for the games offered by the application. The primary character, Alpaca, interacts with the students in Estonian, providing encouragement and motivation through speech. Additionally, the application features a range of appealing and

stimulating visuals and sound effects (e.g., balloons and stars, accompanied by corresponding sounds), which foster a perception that Estonian is an approachable and engaging language.

The Alpa Kids application targets listening, writing, and reading competencies, employing diverse game sets and tasks, such as listening to Alpaca while corresponding images and sounds are presented (Figure 3), drawing letters (Figure 4), singing, reading and listening to poems (Figure 5), and typing letters and words (Figure 6). The application thus effectively contributes to the development of children's Estonian language skills. Moreover, through listening to and reading poems, children also acquire knowledge regarding Estonian culture, as all featured poems are of a folkloric nature.



Figure 5. Poetry videos. Listen and read along. Listen again, which words are missing?

The Alpa Kids application offers the flexibility for children to repeat games and tasks to their liking, enabling multiple repetitions that contribute to the memorization of new vocabulary, phrases, and expressions, associating them with corresponding visuals. These vocabulary games serve as effective exercises for establishing a robust foundation in literacy skills.

During our implementation, we observed that the Typing game (Figure 6) proved suitable for learners across the proficiency spectrum, accommodating both weaker and stronger students. In contrast, the Word Puzzle and Cipher games (Figure 7), which not only enhance vocabulary and spelling abilities but also foster logical thinking, posed challenges for some students, requiring additional support from the teacher.



Figure 6. ALPA kids typing game. Listen to Estonian words and type them

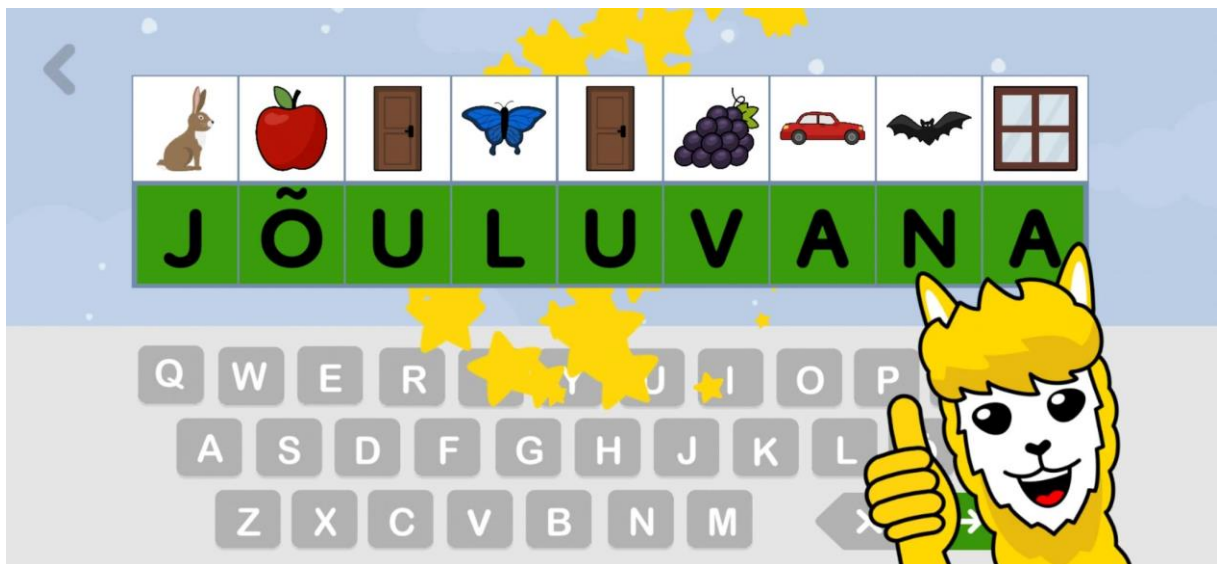


Figure 7. ALPA kids cipher game. Use the first letters of the words to solve a code and find what words are hidden there

The integration of the Alpa Kids application into Nature lessons proved to be tightly intertwined with the acquisition of the Estonian language. Through the application, children successfully learned about 11 Estonian insects, 8 commonly found birds, the leaves of 13 prevalent Estonian trees, and the names of 12 flowers. These thematic components align with the established curriculum and effectively enable children to visualize Estonian nature while immersing themselves in the corresponding natural sounds.

Within the realm of Mathematics lessons, the Alpa Kids application facilitated various activities. Students engaged in identifying shapes through the Shape game, comparing objects to determine the smallest and largest in the Size game, ordering numbers from 1 to 12 and 5 to

20, practicing subtraction within the context of numbers up to 20, learning about the practical application of money through the Shopping game (Figure 8), and developing the skill of telling time with the Clock game.



Figure 8. ALPA kids Shopping game. Calculate how much money you have on the table and see what goods it is enough for

It is noteworthy to mention that among the Mathematics games within the Alpa Kids application, only the Shape game and Subtractions game offer multiple levels of difficulty. Consequently, some students may find the tasks too simplistic, while others may encounter challenges that exceed their current abilities. In order to maintain motivation and cater to individual needs, we employed a differentiated approach by assigning students varying tasks. For instance, stronger students were tasked with logical problem-solving exercises, such as engaging with Sudoku puzzles.

Uncertainties regarding the collaboration between teachers and parents

As the initial idea to use ALPA Kids application was to use it both at home and in school, one of the uncertainties that we face was the level of parental involvement and support. The extent to which parents actively engage with the app and support their child's learning can vary. Some parents may be highly motivated and actively participate in their child's education, using the app as a supplemental tool and monitoring their progress. On the other hand, some parents may be less involved or unaware of the app's existence, leading to limited support and reinforcement of the learning experience at home.

Additionally, language barriers might also pose a challenge in the collaboration with parents. As the students are from Ukraine and their parents do not speak Estonian, which is

the language of the application, it could be difficult for them to understand the educational content of the app or provide guidance to their children.

Furthermore, there could be variations in parents' technological literacy and access to digital devices. Not all parents may have the necessary resources or knowledge to effectively utilize the ALPA Kids app or provide the required technical support to their children. This can create discrepancies in the students' learning experiences, as some may have limited access to the app outside of the school setting or struggle with navigating the app's features without parental assistance.

To encourage parental engagement we decided to hold the workshop and introduce the app to the parents. Parents usually bring children to school and take them back, so the easiest way was to gather after classes. The meeting and its aim was announced and parents were asked to bring the device where ALPA Kids application could be installed. Parents were provided the instructions and explanations in Ukrainian - their native language and addressed any challenges that arise in order to maximize the benefits of the app for the students learning. Games were installed to the devices and the ways of communication in case of any questions were agreed.

After all, we were lucky, as there were not so many students in the class, their parents were supportive and ready to collaborate, and in addition, it turned out that one of the fathers is a software developer and is willing to help other parents in case of any issues with application.

Discussion

The purpose of this autoethnographic research was to address uncertainties and explore the efficacy of digital learning games, focusing on the ALPA Kids application. As a result, the answers to the following research questions were obtained.

We start from the first research question, which concerned uncertainties related to ALPA Kids application as a learning tool. During our research we could observe that the use of ALPA Kids as a digital learning game contributes to the effectiveness of the learning process. The application offers interactive and engaging activities that motivate students to actively participate in their learning. The positive reinforcement provided through friendly-looking alpaca character, visuals, animations, and sound effects enhances students' engagement and enthusiasm for learning. This aligns with previous research on the benefits of digital learning games, which have shown that gamified experiences can promote active learning and increase student motivation (Hetzner et al., 2011).

The study revealed that ALPA Kids can be an effective tool for facilitating language acquisition, particularly in the context of learning the Estonian language. The incorporation of a main character in the application, who communicates with the children in Estonian and provides them with explanations, motivation, and positive feedback was well-received. This feature enhanced the interactivity and engagement of the children with the games (Perotta et al, 2013). The interactive nature of the application allows students to learn at their own pace and choose tasks that align with their abilities and knowledge. This personalized approach promotes a sense of autonomy and ownership over the learning process, which can contribute to faster language acquisition and overall learning outcomes.

Regarding personalization and learning pace, which was the second research question, uncertainties arise in how effectively the ALPA Kids application caters to the diverse needs of students with varying learning styles and abilities. It was observed that the application's different difficulty levels successfully address this concern. The availability of tasks that match students' abilities allows fast learners to engage with more advanced tasks, while slow learners can work at a pace that suits their individual needs. This personalized approach fosters a supportive and inclusive learning environment, ensuring that all students are appropriately challenged. The potential benefits of the application for both fast and slow learners are supported by Landers' research on gamified learning experiences (2014). Landers explores the benefits of gamification in education, highlighting increased student motivation and engagement as key outcomes. His research supports the notion that personalized learning

experiences, such as offering different difficulty levels, can enhance learner satisfaction and performance. ALPA Kids incorporates these principles by allowing students to choose tasks that match their abilities, enabling fast learners to engage with more advanced tasks and slow learners to work at a pace that suits their individual needs.

However, it is important to acknowledge that certain factors, such as the age of the students and their proficiency level in the Estonian language, impose limitations on the extent of choice and differentiation in the games. For instance, the game “Pun” proved excessively challenging for Ukrainian students. One approach to address this issue is to introduce varying levels of difficulty within the same task. For example, the «Clock game» for students with lower proficiency, the task could involve indicating only the hours and half-hours, while for more advanced students, the task could require identifying the quarter-hour intervals. By incorporating different levels of difficulty, the application can better accommodate the diverse abilities and language proficiency of the students, thus fostering a more inclusive and effective learning environment.

Answering the research question regarding the uncertainties of the use of ALPA Kids for teaching immigrants school subjects, our observations indicate that ALPA Kids can be applied beyond language learning and integrated into various subjects, such as Mathematics and Nature. The application provides games and tasks that align with the curriculum and reinforce concepts taught in these subjects. By incorporating interactive elements and gamified experiences, ALPA Kids can enhance students' engagement and understanding of these subjects. This finding supports the potential of digital learning games to supplement traditional teaching methods and provide additional opportunities for students to practice and reinforce their knowledge in different subjects. Our observations confirm the conclusions of the study conducted by Megahed (2021):

Given that ALPA games are in sync with the national syllabus, it gives a good opportunity of practicing and consolidating what has been taught by teachers, as well as broadening the horizon of children.

However, there are differences that should be pointed out. Given that ALPA learning games are primarily intended for preschool-aged children, their applicability in the first-grade setting may be limited. In our case, we were able to use only the fourth, most challenging level of these games. Consequently, this restriction substantially diminishes the available task options and undermines the potential for task differentiation based on varying levels of difficulty.

Finally, we were looking for answers connected with the question the uncertainties regarding the collaboration between teachers and parents. The research findings emphasize

the importance of collaboration between teachers and parents in the implementation of digital learning games. Involving parents in the learning process, particularly through the installation of the ALPA Kids application on their smartphones, facilitates continuity between home and school learning environments. Teachers can provide guidance to parents on the appropriate use of the application and its alignment with the curriculum. This collaboration strengthens the support system for students and creates a shared understanding of the learning goals and strategies.

Throughout this autoethnographic research, several uncertainties and areas of concern have emerged regarding the efficacy of digital learning games, specifically using ALPA Kids as an example. These uncertainties revolve around aspects such as the personalization and learning pace, the application of the games in other subjects, the effectiveness of their use, and the involvement of parents in the learning process. While the findings of this study provide the author's insights and positive outcomes, it is important to acknowledge that uncertainties still exist. For example, it remains unclear how the personalization features of ALPA Kids can effectively cater to the diverse needs of students with varying learning styles and abilities. Additionally, the long-term impact of using digital learning games, such as ALPA Kids, on students' academic achievement and language development requires further investigation. Furthermore, the level of parental involvement and their readiness to engage with digital learning games may vary, posing challenges in achieving effective collaboration between teachers and parents. These uncertainties call for continued research and exploration to address potential limitations and optimize the implementation of digital learning games in primary education.

It is important to acknowledge the limitations of this autoethnographic research. The study focused on a specific context, the author's experience teaching first-grader immigrants in Estonia, which may limit the generalizability of the findings to other educational settings. Additionally, the research relied on the author's observations and personal experiences, which may introduce bias and subjectivity.

Based on the findings and identified uncertainties, several recommendations for further research can be made. Firstly, future studies should aim to explore the effectiveness of ALPA Kids and similar digital learning games in diverse educational contexts to determine their generalizability and adaptability. Large-scale research with a more diverse sample of students can provide a broader understanding of the impact of digital learning games on language acquisition, academic performance, and overall engagement. Additionally, investigating the optimal balance between personalization and standardized curriculum requirements can

provide insights into tailoring digital learning games to meet the individual needs of students while aligning with educational objectives. Furthermore, exploring strategies to enhance collaboration between teachers, parents, and students in the use of digital learning games can help create a cohesive and supportive learning environment. Future research can also delve into the potential integration of digital learning games in remote or online learning settings, addressing the evolving educational landscape and the increasing reliance on technology for teaching and learning.

Conclusion

In our autoethnographic research, we shed light on the uncertainties and effectiveness of the ALPA Kids application as a digital learning tool for first-grade immigrant students in Estonia. The findings have shown that ALPA Kids contributes to the effectiveness of the learning process and enhance student motivation and engagement. However, it is important to acknowledge the limitations of this research. As the study focused on a specific context and relied on our personal observations and experiences, that may introduce bias. The age and proficiency level of the students also imposed limitations on the choice and differentiation of games. Furthermore, uncertainties remain regarding the effective personalization of ALPA Kids for diverse learning styles and abilities, the long-term impact of digital learning games on academic achievement and language development, and achieving effective collaboration between teachers and parents.

By acknowledging the limitations and suggesting future research directions, we can contribute to the continuous improvement and optimization of digital learning games in primary education, ultimately enhancing student learning experiences and outcomes. Looking ahead, we envision several future plans connected to the study. We plan to collaborate with developers sharing our experience of implementing the games in the learning process of Ukrainian students. This cooperation could result in refining and expanding the features of ALPA Kids, addressing the identified uncertainties and limitations. This can involve the development of additional difficulty levels and tasks that cater to the specific needs of different language proficiency levels and cultural backgrounds. Furthermore, we intend to engage in ongoing professional development to enhance our own digital literacy and pedagogical skills, enabling effectively integrate digital learning games like ALPA Kids into teaching practices. By pursuing these future plans, we aim to contribute to the advancement of digital learning game research and the improvement of educational experiences for immigrant students.

References

- ALPA Kids - an Estonian edtech where product is designed by children themselves. (2020). LIMITLESS. <http://surl.li/gvtfz>
- ALPA abil saab Ukraina lastele eesti keelt õpetada.* (2022, June 21). Õpetajate Leht. <https://opleht.ee/2022/06/alpa-abil-saab-ukraina-lastele-eesti-keelt-opetada/>
- Bardone, Emanuele. "Uncertainty as Openness to Decision." The Trovatist, Wordpress, 16 Jan. 2020, <https://chanceseeing.wordpress.com/2020/01/16/uncertainty-as-openness-to-decision/>. Accessed 14 Nov. 2022.
- Bardone, E., Raudsep, A., & Eradze, M. (2022). From expectations to generative uncertainties in teaching and learning activities. A case study of a high school English teacher in the times of covid19. *Teaching and Teacher Education*, 115, 103723. <https://doi.org/10.1016/j.tate.2022.103723>
- Carr, D., Buckingham, D., Burn, A., & Schott, G. (2006, February 1). *Computer Games: Text, Narrative and Play*. <https://doi.org/10.1604/9780745634005>
- Clark, D. (2003). *Games and e-learning*. Epic Group
- Clark, R., & Mayer, R. (2016). *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* (4th ed.). John Wiley & Sons.
- Coles, C. (2013). Learning about uncertainty in professional practice. In L. S. Sommers & J. Launer (Eds.), *Clinical Uncertainty in Primary Care* (pp. 47–69). Springer Science and Business Media LLC. https://doi.org/10.1007/978-1-4614-6812-7_3
- Cooper, R., & Lilyea, B. V. (2022). *I'm Interested in Autoethnography, but How Do I Do It?*. *The Qualitative Report*, 27(1), 197-208. <https://doi.org/10.46743/2160-3715/2022.5288>
- Ellis, C., Adams, T.E., and Bochner, A.P. (2011). Autoethnography: An Overview. *Forum: Qualitative Social Research*, 12(1), Art. 10. Available at: <http://www.qualitative-research.net/index.php/fqs/article/view/1589/3095>
- Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). *Writing ethnographic fieldnotes* (2nd ed.). Liamputtong P, Ezzy D. *Qualitative research methods*. Melbourne: Oxford University Press, 2005.

Eradze, M., Bardone, E., & Dipace, A. (2021). Theorising on covid-19 educational emergency: Magnifying glasses for the field of Educational Technology. *Learning, Media and Technology*, 46(4), 404–419. <https://doi.org/10.1080/17439884.2021.1961802>

Floden, R. E., & Buchmann, M. (1993). Between routines and Anarchy: Preparing teachers for uncertainty. *Oxford Review of Education*, 19(3), 373–382.
<https://doi.org/10.1080/0305498930190308>

Fokides, E., Atsikpasi, P., Kaimara, P., & Deliyannis, I. (2019). Factors Influencing the Subjective Learning Effectiveness of Serious Games. *Journal of Information Technology Education: Research*, 18, 437–466. <https://doi.org/10.28945/4441>

Gadd, D., Rosliakova, D. (2022). *Dazed and confused: a comparative case study of uncertainties in technology use in education* [Master's thesis, University of Tartu].
<http://surl.li/gofge>

Hetzner, S., Protosaltis, A., Pappa, D., Pannese, L. (2011). Serious Games for Formal and Informal Learning. *eLearning Papers*

Jordan, M. E., Kleinsasser, R. C., & Roe, M. F. (2014). Cautionary Tales: Teaching, Accountability, and Assessment. *Educational Forum*, 78(3), 323–337.
<https://doi.org/10.1080/00131725.2014.912371>

Kindsiko, E. (2023, February 21). *Нехватка учителей и специалистов ограничивает возможности обучения украинских детей*. Arenguseire Keskus. Retrieved March 12, 2023, from <https://arenguseire.ee/ru/novosti/nehvatka-uchitelej-i-speczialistov-ogranichivaet-vozmozhnosti-obucheniya-ukrainskih-detej/>

Landers, R. N. (2014). Developing a theory of gamified learning: Linking serious games and gamification of learning. *Simulation & Gaming*, 45(6), 752-768.

Lilles, K. (2020). ALPA educational and fun games for Estonian babies. *E-Koolikot*. <https://e-koolikott.ee/kogumik/25913-ALPA-harivad-ja-lobusad-mangud-Eesti-vaikel-astele>

Macmillan. (n.d.). Uncertainty. In *Macmillan Dictionary*. Retrieved April 4, 2021, from <https://www.macmillandictionary.com/dictionary/british/uncertainty>

Manesis, D. (2020). Digital games in primary education. In *Game design and intelligent interaction*. IntechOpen

McDonald, J. (1986). Raising the teacher's voice and the ironic role of theory. *Harvard*

Educational Review, 56(4), 355–378. <https://doi.org/10.17763/haer.56.4.93q80781768635m3>

Megahed, A. (2021). *Impact of Language Learning Games for Preschool Children Based on the Case Study of Alpa Kids Application* (thesis)

Nowotny, H. (2015). *The cunning of uncertainty*. John Wiley & Sons

Paulos, J. (2007). *A Mathematician Plays The Stock Market*, p.5, Basic Books

Perrotta, C., Featherstone, G., Aston, H., & Houghton, E. (2013). *Game-based learning: Latest evidence and future directions*. In NFER (National Foundation for Educational Research)

Pirk, O. (2020). *Uncertainty of technology use in redesigning a traditional upper secondary school course into an online format: An autoethnographic study* [Master's thesis, University of Tartu]. <https://drive.google.com/file/d/1na8vSFrPBhB3BF4CQdLnUiMJ4sXNUUR8/view>

Prensky, M. (2001, January 1). *Digital Game-Based Learning*.

Selgusid Tallinna selle aasta parimad ettevõtlusteod. (2021, January 10). Tallinn.

<https://www.tallinn.ee/et/uudis/selgusid-tallinna-selle-aasta-parimad-ettevotlusteod>

Stahl, K. (2020). Small Sun Educational Technology Cooperation Project 2019/2020. Väike Päike OÜ. <https://www.lasteklubi.ee/uldine/vaikese-paikese-haridustehnoloogia-alased-koostoop-rojektid-2019-2020/>

Trahar, Sheila. *Autoethnographic Journeys in Learning and Teaching in Higher Education*. European Educational Research Journal, vol. 12, no. 3, 2013, pp. 367–375., <https://doi.org/10.2304/eeerj.2013.12.3.367>

Uncertainty. Definition and meaning. (n.d.). Retrieved from <https://www.merriam-webster.com/dictionary>.

Wheatley, K. F. (2002). The potential benefits of teacher efficacy doubts for educational reform. *Teaching and Teacher Education*, 18(1), 5–22. [https://doi.org/10.1016/S0742-051X\(01\)00047-6](https://doi.org/10.1016/S0742-051X(01)00047-6)

Wood, C., Kemp, N., & Plester, B. (2013). *Text Messaging and Literacy - The Evidence* (1st ed.). Routledge. <https://doi.org/10.4324/9780203693360>

Acknowledgements

I would like to thank Emanuele Bardone, the supervisor of my thesis Associate Professor of Educational Technology, for his invaluable support, guidance, and optimistic approach. I would like to extend my appreciation to Kelly Lilles, the CEO and Co-Founder of ALPA Kids, for encouragement and generous provision of essential information regarding the ALPA Kids application.

Author's declaration

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

I, *Hanna Yaremenko*,

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

“The uncertainties of digital learning games use in teaching young children (by the immersion method)“,

supervised by *Associate Professor of Educational Technology, 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.

Hanna Yaremenko
30/05/2023

Emanuele Bardone
1 June 2023

