

**Digital Pedagogical Creativity among Teacher Candidates in a Creativity-Centered
University Program in Uzbekistan**

by

Rokhatoy Boltaeva

A Doctoral Digital Portfolio submitted to the School of Education of Webster University
in partial fulfillment of the requirements for the Degree of
Doctor of Education

May 2025

Webster Groves Campus Webster Groves, Missouri, United States

© Copyright by

Rokhatoy Boltaeva

ALL RIGHTS RESERVED

2025

*The author hereby grants Webster University permission to reproduce and distribute publicly
paper and electronic copies of this DDP in whole or in part for educational purposes.*

ACKNOWLEDGMENTS

This DDP would not have been possible without the unwavering moral support of my family, including my loving husband, whose belief in my dreams gave me strength during many difficult and sleepless nights. I am also thankful to my five children, who inspire me each and every day, while my mother taught me the importance of resilience and education.

I would like to extend my warmest gratitude to the director of the EdD program, Dr. Nicole Lee-Johnson. Her support in leadership and encouragement on my journey helped me model my ideas with freedom and a structure to enhance my thought process during the program. I am grateful to Dr. Brynne Schroeder for her unwavering and continued support during the last course of the EdD program.

My special appreciation goes to my DDP readers, Dr. Basiyr Rodney and Dr. Kevin Gitonga, for their scholarly mentorship, wonderful feedback, and the time they so generously accorded. Their insights sought to refine my thinking and, in many ways, advanced the development of this project.

To my colleague and fellow researcher, I say thank you to Oybek Imomov for his consistent motivation, engaging discussions, and cordial collaboration throughout the work.

I would also thank my peer-mentors Jonathon Singler and Kerri Fair for their support and guidance during my first and second year of the EdD program.

Table of Contents

Abstract	1
Plan for my professional website	2
Introduction	3
1. Contextualization	5
1.1. Historical Context	6
1.2. Sociocultural Context	8
1.3. Sociopolitical Context	8
Higher Education in Uzbekistan and the MA EDIN Program.....	9
2. Theoretical Framing.....	11
2.1. TPACK Framework in Digital Education	11
2.2. Creativity Models	13
2.3. Integration of TPACK and Creativity Model	15
3. Definition of Key Terms	20
4. Literature Review	22
Introduction	22
4.1. Integration of Digital Tools in Education in Uzbekistan.....	23
4.2. Development of Pedagogical Creativity.....	30
4.3. Digital Pedagogical Creativity	34
<i>Digital Storytelling (DST) as a Creative Pedagogical Practice</i>	35
<i>Digital Pedagogical Creativity in Teacher Education</i>	36
<i>Collaborative Creativity and Social-Emotional Learning</i>	37
<i>DST for Creative Assessment</i>	38
<i>Institutional Support for DST</i>	38
4.4. Teacher Education and Professional Development	39
<i>Ongoing Training Schemes and Aid</i>	40
<i>Emerging Technologies and Training Gaps</i>	41
<i>Enhancing Teacher Education through Mobile and Online Tools</i>	42
<i>Systematic Support Services and Infrastructure</i>	42
<i>Sustainable Professional Development and Mentorship</i>	43
<i>Evaluation and Institutional Leadership</i>	44
Summary of the Literature Review	44
1. Integration of Digital Tools in Education.....	45
2. Development of Pedagogical Creativity	45
3. Digital Pedagogical Creativity (DPC)	46

4. Teacher Education and Professional Development.....	46
5. Statement of the Problem	48
Introduction	48
5.1. Research Gap	48
5.2. Purpose of the Study	49
5.3. Significance of the Study	50
5.4. Research Questions.....	50
6. Methodology	51
6.1. Research Design.....	51
Participants.....	52
6.2. Data Collection Methods	53
<i>Semi-Structured Interviews</i>	53
<i>Focus Group Discussions</i>	53
<i>Digital Artifact Analysis</i>	54
6.3. Data Collection Procedures.....	54
6.4. Data Analysis Procedures	56
6.5. Ethical Considerations.....	58
Researcher Positionality, Reflexivity, and Bias	59
Conclusion.....	60
7. Findings	61
7.1. Overview of Key Findings	61
7.2. Thematic Analysis of Data.....	63
Thematic Analysis of Interviews	63
Thematic Analysis of Focus Groups	78
Thematic Analysis of Digital Artifacts	87
8. Discussion.....	91
8.1. Interpretation of Findings	91
8.2. Connection to Theoretical Framework.....	95
8.3. Implications for Research Communities and Marginalized Communities	103
<i>Research Community Implications</i>	103
<i>Implications for Marginalized Communities</i>	104
<i>Policy Implications</i>	105
8.4. Limitations of the Study	105
<i>Limited Generalizability</i>	106
<i>Self-Reported Information and Social Bias</i>	106

<i>Short-Term View</i>	107
<i>Overrepresentation of Urban Teachers Compared to Rural Educators</i>	107
<i>Focus on Certain Types of Digital Aids</i>	107
<i>Reflexive and Ethical Issues</i>	108
8.5. Recommendations for Future Research.....	108
Digital Media in DDP	113
References.....	117
Appendices.....	124
Appendix A Recruitment email.....	124
Appendix B Interview Questions.....	125
Appendix C Focus Group Questions.....	126
Appendix D Informed Consent Form.....	127
Appendix E Themes and Coding for the focus groups.....	129
Appendix G Digital Artifacts.....	132

Abstract

This study investigates how digital pedagogical creativity is conceptualized and demonstrated by pre-service and in-service teachers enrolled in the MA EDIN program at a university in Tashkent. In response to the growing need for innovative digital teaching practices in higher education, this qualitative case study examines how teachers engage with digital tools and creative pedagogies during their coursework. Data was gathered from 30 participants through semi-structured interviews, focus groups, and analysis of 55 digital artifacts. The study uses thematic analysis with NVivo software to understand how patterns of creativity as action are performed in digital learning environments. This research attempts to reconceptualize digital pedagogical creativity in locally relevant ways and builds on the international discourse concerning teacher education creativity. The results will help shape the expected practices of teachers, the curriculum, and institutional policies on fostering creativity in educational teaching practices using modern technologies.

Plan for my professional website

As part of the EdD coursework, I developed a professional website, which has been a valuable platform for showcasing my research. Thus, I used this website, located at <https://sites.google.com/view/rokhatoymboltaeva> to incorporate some digital content related to DDP Research.

The website is essential for this project because it serves as a multimodal platform for presenting research outside the scope of academic writing. I aim to use embedded digital content, such as word clouds, infographics and concept maps created with Canva, to help as many people as possible, including educators, researchers, and policymakers, visually comprehend the concepts and ideas captured in my findings. Moreover, the site provides anonymous participant quotes demonstrating that participants have experience with digital pedagogy, further enriching the qualitative aspects of my study.

The website is in the form of a blog distinguished by informal style and academic content. Regarding academic discourse, it is a tool for knowledge mobilization, encouraging the community to interact in digital creative pedagogy. Making my research available for public access invites me to receive comments, suggestions, and potential collaborative interests from other institutions. Additionally, I updated my LinkedIn profile with the completed milestones of my DDP, thus linking the research to the job market. As a start, I used Facebook and Instagram and tagged the posts with digital pedagogy hashtags (#digitalpedagogy #UzbekEducation #TeachEd) to stimulate discussions on digital pedagogy in Uzbekistan.

My goal is to use social media and my website as tools to ensure that my research is read, actively discussed, and practiced within real-world educational settings.

Introduction

There is considerable discussion about the role of digital technologies among researchers in educating future teachers. Digital pedagogical creativity is an emerging concept describing how digital tools and technologies are employed for creative teaching, and it occurs when educators use digital tools for creative pedagogy and learning (Mishra & Koehler, 2006; Sawyer, 2012). Beghetto and Kaufman (2014) argue that the ability to apply creativity in modern pedagogy is not just an additional competency; it allows teachers to create activities that develop learners' problem-solving abilities. This research investigates the application of digital pedagogical creativity by teachers of a creativity-focused university program in Uzbekistan.

Novel digital technologies are profoundly impacting the education sector as they modify the conventional ways of teaching and fostering creativity within classrooms. The growth of technology and globalization has made it almost compulsory to include digital technologies in education to prepare learners for emerging global challenges and prospects. The relationship between technology and creativity is one of the important gaps in educational research, especially about how teachers can use digital technologies to enhance creative teaching. This doctoral digital portfolio aims to shed light on this issue and is focused on digital pedagogical creativity among teacher students from a creativity-oriented university in Uzbekistan, a country experiencing significant educational and technological transformation.

This study seeks to address some aspects of digital pedagogy by exploring participants' perspectives, experiences and challenges with a focus on the sociocultural and institutional contexts of technology in teacher education. The study is set in the context of an MA EDIN

program launched as part of a graduate reform initiative in Uzbekistan that aims to improve the quality of education using technology and creativity.

The study takes an innovative approach by adopting the Technological Pedagogical Content Knowledge (TPACK) model developed by Koehler and Mishra in 2006, which looks at the intersection of technology use, pedagogy, and content in creative organizational contexts. It also applies techniques of creativity theories (Amabile, 1983; Csikszentmihalyi, 1996) concerning how digital tools can become instruments of creative pedagogy. Considering these models, the study articulates how creativity can be developed in digital teaching within a specific learning context.

Addressing this issue offers a new perspective regarding digital pedagogical creativity in conjunction with the growing educational system in Uzbekistan. The findings of this research are intended to benefit the teacher education training program, curriculum, and policy development aimed at enhancing digital creativity at a higher educational level.

The research also assesses the use of digital tools in Uzbekistan's education system. Such context is specific because it pertains to a country trying to rapidly digitize but having unequal access to technology and a post-Soviet pedagogical transition. This study, which applies creative methods such as digital storytelling, uses context-specific, innovative approaches to teaching to understand how creativity can be implemented in real-world school settings. The study investigates the impact of teacher education and training on the primary and secondary levels, particularly the need for adequate support, institutional infrastructure, and policies that allow digital techniques.

This research seeks to contribute to the existing literature by concentrating on teacher candidates from Uzbekistan, who have rarely been studied about digital educational

innovations. In answering the research question, this study aims to shape institutional programs and national education policies to enable Uzbekistan's teacher training systems to align with modernization goals. Given the limitations of this context, the work offers practical solutions that address specific resource and structural difficulties, which are likely to be applicable in other educational environments with similar conditions transforming to digital systems.

The DDP is organized into five sections, each dealing with an important part of the problem studied. The first section discusses the study and its context, its purpose, research questions, importance in digital pedagogical creativity in Uzbekistan, and sociocultural and sociopolitical history. The second section presents the theories used in the research on applying the TPACK Framework, with models of creativity and the tools of teaching and modern technology as they relate to the teaching processes in the classroom. The third section analyses existing literature on the use of digital tools for education, the increasing pedagogical creativity, and the general pedagogy and pedagogy of the science and practice of professional development of digital pedagogical creativity. The fourth section describes the methodology of study, policy, and institutional and classroom strategies emphasizing data collection and analysis strategies. The fifth section discusses the results, focusing on the digital pedagogical creativity of the teacher candidates, the problems they encountered, and the solutions to be adopted. This section also covers the evaluation of a teacher's training in the use of digital media and the assessment of digital works made by the students. This DDP includes final thoughts about policies and curriculum revisions as well as other research that could support the implementation of digital creativity in the pedagogical process of educational institutions.

1. Contextualization

The use of technological creativity in the teaching and learning processes related to teacher training needs a thorough examination of the historical, sociocultural, and sociopolitical

milieu of Uzbekistan. Uzbekistan, as a post-Soviet state, has undertaken significant changes to its education system since gaining independence in 1991. These changes have progressed from rigidly controlled, top-down systems to more open and inviting approaches (Silova, 2009; Makarova et al., 2021). Some policies, like the Digital Uzbekistan 2030 strategy (PF-6079-son, 2020), have aimed at promoting the employment of educational technologies and the infrastructural development of education. However, inequities in technological access, such as lack of internet and devices, especially in rural areas, still need to be addressed (Warschauer & Matuchniak, 2010). The research concentrates on new emerging practices that foster creative and innovative thinking among teacher candidates at a university in Uzbekistan.

1.1. Historical Context

The educational system of Uzbekistan has undergone significant changes since gaining independence from the Soviet Union in 1991, including policy shifts and pedagogical reform. Efforts to harmonize national education and global education universalization have characterized Uzbekistan's education development history. The modernization reforms' objectives that took place in the early post-independence period focused on dismantling Soviet-style pedagogical approaches of rote memorization and introducing more learner-centered instruction (Sabirova, 2020). It has also been the case that in the past 10 years, there has been a greater focus on online learning and spending more money on establishing online education sites and ICT equipment as well as training teachers (Usmonov, 2018). The whole educational system of the Republic has undergone fundamental restructuring, which is still taking place (Ruziev & Burkhanov, 2018). The country has evolved from a Soviet-style centralized education structure to a more current and learner-oriented model. Lately, Uzbekistan has been applying new technologies in education with the help of the "Digital Uzbekistan 2030" (Presidential Decree PF-6079, 2020). The integration of technology into the teaching and learning processes is considered one of the most crucial indicators of innovation and creativity

in education, which largely informs the scope of this research on digital pedagogical creativity (Selwyn, 2016).

Table 1. Educational Policies in Uzbekistan in three periods (own illustration)

Period	Key Educational Policies	Impact on Teacher Training	Influence on Digital Pedagogy
Pre-Soviet Era	<ul style="list-style-type: none"> ❖ Non-formal religious instruction through a madrasa system ❖ Government's role was virtually non-existent ❖ Focus remains rooted in theology and classical sciences 	<ul style="list-style-type: none"> ❖ There was no teacher training at the college. ❖ Teacher training was limited to religious scholars. 	<ul style="list-style-type: none"> ❖ There was no digital pedagogy (pre-digital age).
Soviet Era (1920s–1991)	<ul style="list-style-type: none"> ❖ Control of education is centralized under the state ❖ Focus remains ideological and set curriculum ❖ Emphasis on polytechnic instruction 	<ul style="list-style-type: none"> ❖ The state - issued policies for teacher training. ❖ There was a high focus on discipline and everything being standard 	<ul style="list-style-type: none"> ❖ There were simple technological aids for teaching purposes. ❖ Little to no focus on creativity
Post-Soviet Era (1991–Present)	<ul style="list-style-type: none"> ❖ Shifts toward decentralization and modernization ❖ Adoption of a market economy structure ❖ Digital Uzbekistan 2030 	<ul style="list-style-type: none"> ❖ Introduction of new initiatives for teacher training. ❖ High emphasis on creativity and innovation. 	<ul style="list-style-type: none"> ❖ Stricter focus on digital technologies ❖ The application of teaching pedagogy with digital technologies.

The table provided shows the trajectory of education policy in Uzbekistan, where managing educational policy in Uzbekistan started from a highly centralized and ideologically motivated one to more recent, less-centralized, innovation-focused ones. Digital Uzbekistan 2030 is one of the recent efforts which was aimed at national nurturing of imagination and digitalization, but there still exists a lack of comprehensive, teacher training, organizational

support, and institutional gap frameworks within policies. These mismatches between the imposed reform and the living realities in schools underscore the importance of the study investigating how pre-service teachers deal with digital pedagogical creativity in a transforming system.

1.2. Sociocultural Context

The sociocultural setting of Uzbekistan reflects a blend of deeply rooted traditional values and modern influences. Education is also highly valued by society as an important instrument for personal and national development. In a culture that strongly values education, this environment allows innovative teaching practices to flourish, including implementing digital resources to foster creativity. Teachers' perceptions of digital creativity are impacted by the long-existing teacher-centered educational practices in Uzbekistan. Although creativity is given importance in the global education discourse (Craft, 2005; Robinson, 2011), the case of Uzbekistan is quite different, with a focus on schooling with a predominant focus on teacher-led instruction (Silova, 2009). An understanding of the classroom as a bounded space where the teacher commands all the information may obstruct the possibility for more learner-focused, technologically advanced, and creative processes to take place (Eickelman, 1998; Tregubova, 2021). In addition, sociocultural perceptions of digitalization are typically mixed, ranging from eagerness to detachment. For example, younger educators tend to adopt new methodologies more quickly, whereas the older generation is more skeptical and has less faith in modern technology due to low confidence in its efficacy (Kovpak & Lebid, 2022).

1.3. Sociopolitical Context

Through funding and curriculum mandates, government policies play a major role in adopting digital pedagogical creativity. Gulyamov et al. (2023) point out that increasing digital literacy, together with the use of digital technologies within the education system, can improve

the educational and humanitarian outcomes of the region. For example, national policies and registers provide finances and resources to support digital learning, but at the same time, teachers are bound by strict curricular prescriptions and national examinations that do not allow them to use their creative digital pedagogy. The resistance to change, insufficient training, and lack of digital resources that are relevant to context are some of the issues that remain persistent (Ruziev & Burkhanov, 2018; Elicker et al., 2022; Gulyamov et al., 2023). Furthermore, the urban-rural gap in the availability of digital resources presents further problems, where urban universities are more equipped with modern technologies, high-speed internet, and teacher training programs than rural counterparts (Makarova et al., 2021). This complex sociopolitical landscape must be understood to stimulate digital pedagogical creativity in Uzbekistan, as it shapes the processes of educational reforms and the use of technology in teaching.

Considering these issues concerning the digital transformation of Uzbekistan, this research investigates how teacher candidates exercise and showcase digital pedagogical creativity within those boundaries. Together, the sociopolitical context, the historical background, the norms, and the values create the particular setting within which this research is grounded.

Higher Education in Uzbekistan and the MA EDIN Program

The study includes focus group discussions with teacher participants enrolled in the Master of Arts in Education and Innovation (MA EDIN) program at a university in Tashkent, Uzbekistan. This program aims to help teachers adapt to new teaching methods that require advanced skills and technology as part of the broader goals of educational reform and modernization. This study will evaluate the experiences of the teacher candidates to understand the ways pedagogical creativity in Uzbekistan is reframed to be more inclusive of digital technology and how transformational learning can occur in the system.

Renowned for its cultural heritage, Uzbekistan has made significant investments in its university system (Usmonov, 2018). Colleges and universities across the country are adapting to digital skills and global competitiveness while preserving their own values and cultural identity (Tregubova, 2021). This makes international universities in Uzbekistan even more valid: they have an argument for industry-tuned programs. The nation's youth need international degrees and programs to remain competitive in expanding global education and industries (Sharipjonovich, 2019).

The government of Uzbekistan requires that foreign higher education programs enter the country to meet the demands of improving its higher education system, given the country's growing population and university enrollment rate (Makarova et al., 2021). The Presidential Decree on the “Concept of Development of Higher Education of the Republic of Uzbekistan until 2030” marked a new era in the development of higher education in Uzbekistan on October 8, 2018. This decree enables many foreign universities to establish their institutions and branch offices in the country, with an average of five new ones being added annually. As a result, the number of international universities, particularly those from Russia, increased dramatically—from just seven in 2016 to over 50 by 2022 (PF-5847, 2019).¹

This expansion of international educational institutions has had a profound impact on the educational curriculum in Uzbekistan, particularly in Tashkent. The selected university in Tashkent is one of the leading universities that hopes to change the region's educational face. For example, the university has developed a Masters of Arts in Education and Innovation (MA EDIN) program whose goal is to prepare educators to operate within modern, innovative instructional settings. This illustrates the university's efforts to improve educational practices

¹ PF means President Farmoni, in English Presidential Decree. The President of the Republic of Uzbekistan adopts normative legal documents through decrees, decisions, and orders to ensure their implementation based on the Constitution and all laws. By paragraph 30 of the regulations of the Office of the President, the documents of the President of the Republic of Uzbekistan aimed at determining, changing, or canceling legal norms as universally binding state instructions are considered normative legal documents and are adopted in the form of decrees and decisions.

in Uzbekistan, in tandem with the responsive needs of changing educational reforms, modernization policies, and serves as a primary context for this study.

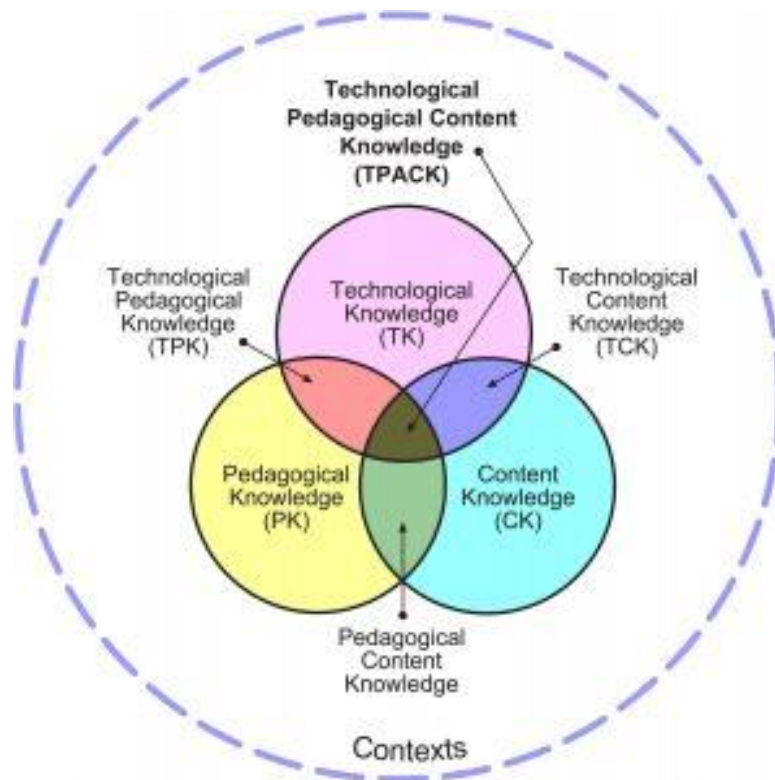
2. Theoretical Framing

The combination of technology and pedagogy is transforming educational systems worldwide, requiring teachers to use digital technology in novel ways to improve learning. This research utilizes three complementary theoretical approaches to analyze the ‘digital creativity in pedagogy’ phenomena, specifically within Uzbekistan. Each of them from a different but interrelated perspective: TPACK (Koehler & Mishra, 2006) deals with technology, pedagogy, and content knowledge integration; Amabile’s Componential Theory (1983) accounts for the emergence of creativity because of personal and contextual factors; and Csikszentmihalyi’s Systems Model (1996) covers the culture and institutional frameworks that shape creativity.

2.1. TPACK Framework in Digital Education

The TPACK Framework focuses on the overlap between pedagogical, technological, and content knowledge in teaching and learning. TPACK makes it possible to appreciate better how educators can be prepared to face the realities of teaching in a contemporary classroom (Mishra & Koehler, 2006). This level of integration is critical when creating lessons that make use of digital resources in a productive manner while achieving the educational objectives and effectively responding to the needs of the learners. The integrative approach assists educators in learning to conceptually blend the TPACK framework with a theory about how technology can enhance pedagogy and content delivery (Koehler & Mishra, 2006). Instead of viewing digital instruments as isolated components, TPACK adopts a holistic view, integrating technology with pedagogy and content. In this approach, teachers are encouraged to move from merely employing technology to its full integration within all three spheres supporting the learner.

Figure 1. TPACK model as presented by Koehler and Mishra,2006



When examining teachers who use a range of digital tools, the issue is more complex than just the comfort of the teacher using the tools. The TPACK framework provides an emphasized balance shift from knowing to doing in which technology is not the focal point but rather a means of achieving pedagogical objectives (Thyssen et al., 2023; Baran et al., 2011). The relationship between teaching content, pedagogical practices, and technology is crucial for developing responsive teaching to the needs of learners in the modern world.

In Uzbekistan, using digital technologies in education is an emerging practice that is not widely adopted. The TPACK model addresses regional problems and provides practical solutions with available specific resources. Various digital resources such as individualized instruction tools or even virtual reality can as well transform the approaches to teaching to a greater extent, especially language teaching (Mubinabonu & Sohob, 2024; Rocha et al., 2011). For instance, VR simulations can provide students with opportunities to practice the language in context through the creation of new learning environments (Mubinabonu & Sohob, 2024).

These tools, however, are rarely found in practice because of inadequate infrastructure and poor educator training. Such obstacles could be resolved through the implementation of TPACK-informed teacher education programs.

Embedding TPACK into assessment practices like digital teaching portfolios allows for a more systematic way of assessing and supporting the imagination in the pedagogical design of teacher candidates. Through portfolios, educators can view firsthand the effectiveness with which the candidates can integrate digital technologies into the pedagogical and content aspects of their teaching, which demonstrates their readiness to operate in a digitally enhanced teaching environment (Koehler et al., 2017; Wang, 2024).

2.2. Creativity Models

The Componential Theory of Creativity states that it is reasonable to conceptualize creativity as a function of three internal components, domain-relevant skills, creativity relevant processes and task motivation, and one external factor, the environment. In teacher education, the relevant domain skills encompass content knowledge with digital support and creativity concerning the functionality of various teaching tools.

The second component, creativity-relevant processes, refers to divergent thinking, flexibility, and problem-solving skills. MA EDIN and similar programs can significantly contribute to the development of these processes by motivating teacher candidates to authentically use new technologies like interactive applications in their teaching (Pozilova, 2023; Mubinabonu & Sohib, 2024).

Task motivation, which is the third internal component, affects the likelihood of creative outcomes. Intrinsic motivation, in the form of personal hobbies or career goals, increases involvement in the performance of creative endeavors, such as in the case of the “Creativity in Education” project aims to develop teachers’ logical and creative thinking skills (Pozilova, 2023; Sullivan, 2017).

Support from the institution, the availability of technological tools, and a supportive attitude towards creative risk-taking make up the necessary conditions for creativity. The MA EDIN environment assumes that a creativity-supportive environment can be cultivated through integrated pedagogy and technology in teacher education (Tamim et al., 2011; Pozilova, 2023).

While Amabile focuses on individual and environmental factors in creativity, Csikszentmihalyi (1996) takes a broader view. His systems model defines creativity as a socially constructed attribute, the result of interactions between people, domains of knowledge, and gatekeeping institutions. This angle captures well the teacher education systems influenced by legacy systems, like in the case of Uzbekistan. In teaching digital pedagogical creativity, this model draws attention to the integration of technological intelligence (domain), educational infrastructure (field) that enables innovation, and the actions of trained teachers (person) (Csikszentmihalyi, 1996; Sullivan, 2017). For example, a teacher candidate familiar with digital storytelling already represents a person who can produce valuable educational content that is recognized within the sphere. Unlike barriers like a lack of institutional support, creativity can be unlocked through other institutional framework supports.

This highlights the importance of policy approaches as well as other frameworks concerning the institutional setting and individual competencies integrated towards promoting creativity with education technology.

The Creativity Model, which was developed for this purpose, underlines the processes and conditions supporting creativity development in digital pedagogy. The model is based on theories of creative problem-solving developed by Amabile (1983) and Csikszentmihalyi (1996) and identifies key factors that encourage creativity in teaching and learning: openness to new ideas, context, collaboration, and reflection. This model uses TPACK to transform its core components by integrating the Creativity Dimension.

- ❖ Technological Creativity (TC): This concept motivates the use of digital tools in creative ways to improve teaching practice.
- ❖ Pedagogical Creativity (PC): This involves different types of approaches to ensure that students actively think and participate in lessons.
- ❖ Content Creativity (CC): This involves modifying the subject matter to make it more interesting and appropriate for the learners.

2.3. Integration of TPACK and Creativity Model

A new paradigm is suggested in this document that employs the Creativity Model as part of the TPACK framework. This change shifts focus towards creativity in developing a particular pedagogical approach which incorporates creativity through technology. For instance:

Implications for the Study

The integration of the Creativity Model and TPACK provides a more comprehensive view of how teachers in Uzbekistan can leverage digital tools to foster creativity. It also defines the cultural, social, or institutional aspects that influence the use of creative digital pedagogical practices. This advanced framework will also shape data collection and interpretation so that the study is more thorough in understanding the relationships between creativity and technology in teaching and learning.

1. Contextual Adaptation

Uzbekistan's cultural context plays an important role in education and creativity. Language, cultural background, and social values influence how people perceive or employ digital approaches to creativity (Elicker et al., 2022). For this reason, when studying master's degree students' creative behavior inside their coursework environments, these contextual aspects will be considered.

Understanding the impact of pedagogical creativity blended with technology on an educational system becomes essential, especially in the context of the ongoing transformation in Tashkent City or elsewhere. With a forward-looking perspective, this study aims to shed light on the emerging educational challenges in Uzbekistan. Through scrutiny, this study intends to improve practices and cultivate advanced developmental skills in teacher education candidates.

The focus of the research is the sociocultural and the educational landscape of Uzbekistan, which will explore the application of TPACK in various cultural contexts. This DDP contributes to these trends by providing more specific information about the framework and proposing actual measures to incorporate digital creativity in different educational contexts.

2. Empirical Validation

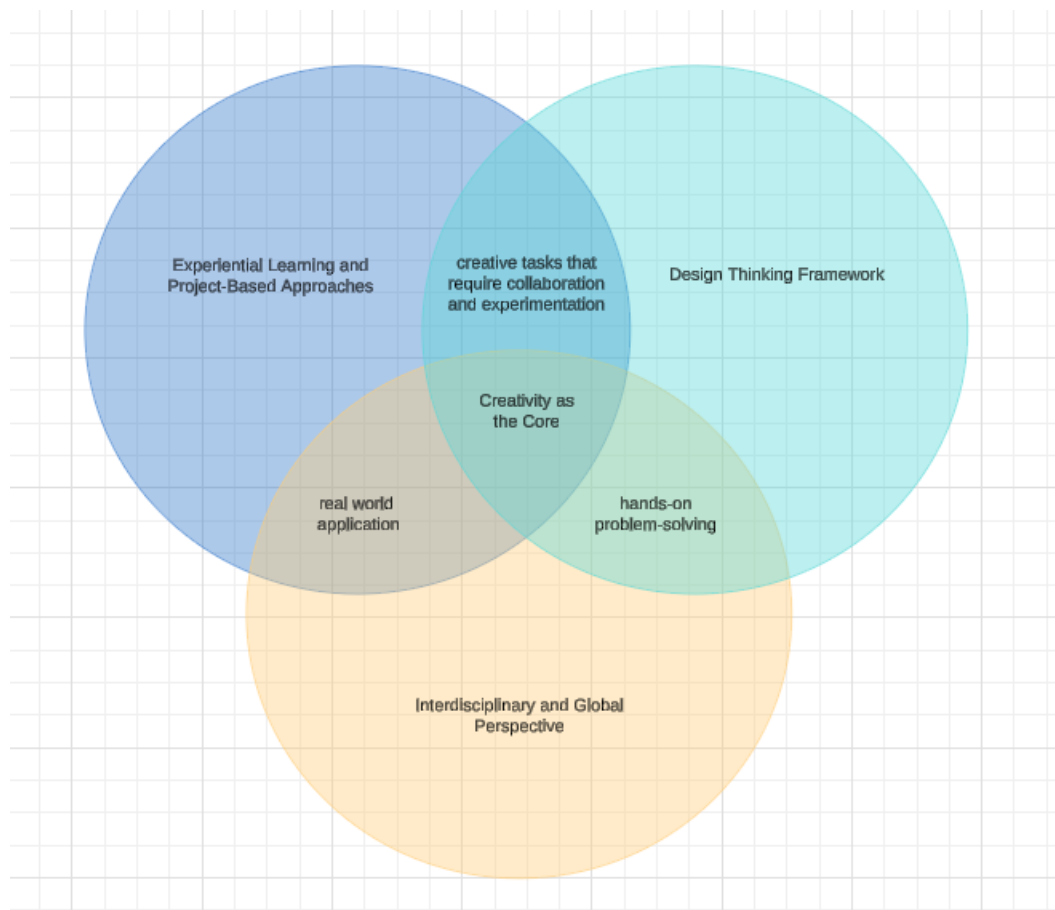
This research aims to conduct a review on education blended with reflective methodologies and qualitative approaches, which examines how TPACK could be used to promote digital creativity.

This study seeks to demonstrate how TPACK could improve teaching practices and outcomes by conducting a qualitative analysis of data gathered from pre-service and in-service teachers, thereby corroborating the theory with empirical data. In addition, the study will examine the degree to which TPACK creates a constructive learning environment to develop implementation and best practice frameworks. Accordingly, the study intends to analyze the most effective TPACK integration features to determine how TPACK can be tailored to different learning environments through extensive data analysis. In the end, educators will understand how intentional, creative teaching approaches can boost digital creativity in their schools.

The intersection of these frameworks is notable at several points: TPACK addresses digital pedagogical teaching creativity as a subset of the professional knowledge base, and Amabile pays attention to the motivating and specific area influences that drive creative activity. In drawing these

models, this study comprehensively understands the phenomenon of digital pedagogical creativity within the context of a changing educational setting. Students will ultimately benefit from richer educational experiences as they provide educators with a strong framework for developing and applying innovative teaching practices. The improved model will also be a valuable resource for scholars, providing fresh perspectives on the relationship between education, technology, and creativity.

Figure 2. Creativity Model (Rodney, 2024)



Moreover, this study incorporates well-constructed theoretical frameworks, and a creative education model developed internally at Webster University (Rodney, 2024). It includes four pillars—Creativity Core, Experiential Learning, Design Thinking, and Interdisciplinary and Global Perspectives—each of which seeks to promote innovation and problem-solving as fundamental competencies in higher education. Although it has not been widely published, this model embodies institutional attempts to enact creativity through curriculum development,

professional learning, and transdisciplinary collaboration. Including this practice-based model enhances the relevance of this research by grounding it in the theory and institutional application of the MA EDIN program.

Foundation: Creativity Core

The purpose is to generate a culture of creativity and cutting-edge thinking as a fundamental competence in problem-solving and educational leadership, and the key components are:

- ❖ Review articulated policy on the providing intellectual risk (Robinson, 2011).
- ❖ Include it in every subject area instead of just one course (Amabile, 1996).
- ❖ Create an atmosphere where students can develop different ideas (Webster University, 2024).

Experiential Learning and Project-Based Approaches

The purpose is to engage in learning tasks, or more like educational activities that utilize the creative capabilities of the learners in a real-life context. The key components are:

- ❖ Develop projects that are academic to enhance the problem-solving skills of the learners (Guilford, 1967).
- ❖ Use projects in the classroom that engage learners in teamwork and task their creativity (Webster University, 2024).
- ❖ Provide practical learning experiences through virtual means that would otherwise be difficult to reproduce (Webster University, 2024).

Design Thinking Framework

The purpose is to use design thinking concepts as a systematic way of doing the most innovative and creative activities in education, and the key components are:

- ❖ Discuss how to resolve problems by meeting the demands and expectations of educators, learners and the stakeholders (Christensen, 1997).

- ❖ Encourage students to follow designed ideas where they develop a solution, try it out and modify the concept (Webster University, 2024).
- ❖ Support cultural sensitivity and a world outlook, especially through hybrid forms such as the Tashkent campus (Webster University, 2024).

Interdisciplinary and Global Perspective

The purpose is to combine many areas with innovative ideas from around the world to help students better their creative abilities and key components:

- ❖ Facilitate cross-discipline practices with psychology, business and education to provide more rounded approaches (Webster University, 2024).
- ❖ Support cultural sensitivity and a world outlook especially via forms such as the Tashkent campus that are hybrid in nature (Webster University, 2024).
- ❖ Build courses and activities that encourage students to approach one educational issue and more from both a local, national, and global angle (Rogers, 2003).

Assessment of Creativity

The purpose is to evaluate students' capacity for practical creativity using actual assessment strategies without traditional assessment tasks, and the key components are:

- ❖ Instead of traditional types of testing, other ways of assessing students' creativity, such as portfolios, projects, and alternate assessments, include students' own digital artifacts (Amabile, 1996).
- ❖ Provide quick formative assessments in which students engage actively during classes and receive responses rather than waiting until the report (Csikszentmihalyi, 1996).
- ❖ Take some examples of summative assessments including, but not limited to, capstone assessments which synthesize creative output and leadership (Webster University, 2024).

3. Definition of Key Terms

1. Digital Pedagogical Creativity (DPC)

This concept addresses the use of digital tools and novel pedagogical practices to improve student participation, creativity, and learning. DPC goes further than the straightforward approach of integrating technology—it analyzes how digital tools facilitate creative thinking, teamwork, and problem-solving within the educational setting.

2. Technological Pedagogical Content Knowledge (TPACK)

A teacher’s theoretical understanding of integrating technology, pedagogical strategies and a particular subject’s content knowledge to form purposeful learning experiences “makes the work with students” (Mishra & Koehler, 2009). The model demonstrates the importance of the connection between the three domains of teaching and learning in contemporary society.

3. Creativity Models

The framework considers the occurrence of creativity in terms of the interrelation among skills, processes and motivation. This study is primarily guided by two models:

Amabile's Componential Theory of Creativity (1983) emphasizes the significance of domain-relevant skills, the creativity-relevant processes, and intrinsic motivation for performing creative tasks.

Csikszentmihalyi’s Systems Model of Creativity (1996): focuses on the creation and recognition of creative work by an individual, domain, and field.

4. Digital Tools

Tools, software, and websites are usually employed to facilitate the teaching and learning processes. In this case, the principal digital tools are:

Kahoot, Quizizz, and Worldwall for gamification.

Canva and Miro for visual storytelling and creativity.

Google Classroom and Padlet for student-centered learning.

5. Pedagogical Innovation

The application of new or different teaching techniques, plans, or resources to improve learning results. As it relates to this study, pedagogical innovation refers to the novel application of digital technologies to capture students' attention, to foster collaboration among learners, and to teach higher-order skills.

6. *Professional Development*

Training and instruction is provided for a teacher to receive additional knowledge, skills, and competencies. In this case, professional development prepares teachers to use digital pedagogical imagination in their classes.

7. *Research Gap*

Insufficient scholarly research, information or analysis concerning the defined topic. For this purpose, the gap refers to the lack of study about using digital technology to stimulate teacher creativity in Uzbekistan's educational system, with a special focus on the pre-service and in-service teacher training programs.

8. *Reflexivity*

A form of self-reflection that requires a researcher to consider how their specific position, biases and experiences affect the way the research is conducted or how findings are interpreted. Reflexivity enhances the quality of qualitative research by ensuring that such research is objective and accountable.

9. *Triangulation*

A method of investigation that utilizes several data sources or different procedures or theories to verify the same result. In this study, triangulation involves interviews, focus groups and analysis of digital materials to increase the credibility of the results.

10. *Ethical considerations*

This ensures that the research is fair, transparent, and respectful. This study provides ethical guidelines on informed consent, participant confidentiality, and withdrawal at any stage.

4. Literature Review

Introduction

According to Selwyn (2016), technology has made it possible for old techniques of teaching and learning to be replaced with more engaging learning experiences. Digital pedagogical creativity is defined as the imaginative application of an educator's digital instruments in designing learning activities involving the student's participation, problem-solving, and creative thinking activities" (Mishra & Koehler, 2006; Sawyer, 2012; Chen et al., 2023).

This literature review aims to document the pedagogical creativity and professional development of teachers within a digital context. It analyzes existing literature that combines technology, pedagogy, and creativity. It also analyzes the assessment of the integration of digital technology tools, the development of pedagogical creativity, and the training and education of teachers in digital pedagogical creativity.

Regarding the global and Uzbekistan context, subsection 4.1 analyzes the integration of technology tools in a region's education, including the possibilities and obstacles presented by the region's digital transformation. Subsection 4.2 tackles the improvement and development of pedagogical creativity and describes the new forms and techniques of teaching that can be produced by applying information technology and other inventive pedagogical means. Subsection 4.3 is about digital pedagogical creativity and its importance in transforming learners' educational and academic experiences and facilitating learner participation and motivation using technology and creative teaching methods. Lastly, subsection 4.4 deals with the issue of teacher training and professional development with special emphasis on systematic training, institutional provision and essences, and teacher empowerment to translate theory into practice and adequately integrate creativity in the teaching pedagogy.

Referring to earlier research, this review seeks to clarify existing research on DPC and its impact on teacher training, institutional policies, and curriculum design. The outcome will build the research's framework and help place it in the larger scholarly discourse of education, creation, and the ever-evolving digital world.

Although these studies look at the integration of technology and creativity from different angles, very few investigate how these come together within the context of Uzbekistan's post-Soviet, resource-limited teacher training system. This DDP seeks to fill this gap by examining how digital pedagogical creativity is understood and practiced in an MA teacher education program in Tashkent.

4.1. Integration of Digital Tools in Education in Uzbekistan

In Uzbekistan, the spread of digital technologies in education started in the early 2000s because of government-provided infrastructure development, e-government projects, and investment in the IT sector (Presidential Decree PF-6079, 2020; Gulyamov et al., 2023). These initiatives created prerequisites for educational technology within the broader objectives of building a digital economy. As noted earlier, “Digital Uzbekistan-2030” demonstrates such commitment as it aims towards greater integration of ICT and improvement in the information technology education. Cooperation with UNESCO and the ITU, among other organizations, has reinforced this agenda. Despite these efforts, there is usually no consideration of the imbalanced resource allocation, particularly within urban and rural regions, which hinders fair use of digital resources in classrooms (UNESCO, 2020; Gulyamov et al., 2023).

Users have considerably increased by 60% since 2016, leading to improved internet access (Gulyamov et al., 2023). High-speed internet facilitates collaborative platforms such as Edmodo and Google Classroom. In addition, mobile technologies allow for engaging learning and assessment (Voogt et al., 2012; Rasulova & Nizomova, 2024). However, there are still

gaps in social equity. Families with relatively low incomes do not have sufficient access to the necessary devices and stable internet connections. Thus, the digital divide continues to exist (Warschauer & Matuchniak, 2010). These gaps require specific policies and subsidized technology solutions to fill the void.

This has triggered further research into the use of multimedia technologies and their view from pedagogical scaffolding. Tamim et al. (2011) and Voogt et al. (2012) particularly focus on integrating multimedia to enhance learners' attention. He called attention to "Digital natives," students of the recent generation, which earned him Prensky (2001) recognized that this phenomenon creates a new set of pedagogical problems, but during the last decade, it has received much criticism for its oversimplification. Many educational frameworks have been developed based on Prensky's (2001) "digital natives" idea, but it has received criticism as well. As Selwyn (2016) argues, the explanation about digital natives is profoundly simplistic and fails to factor in numerous contextual pedagogical aspects surrounding the technologies that learners interact with, including the important technology integration for learning pedagogy. Ifenthaler and Schweinbenz (2016) report positive attitudes and engagement when using tablets, while Moradi and Chen (2019) have studied the impact of digital storytelling on student creativity and involvement. In Uzbekistan, several programs, such as Duolingo, Rosetta Stone, ClassPoint, and Parlay Genie, have appeared for language learning and gamified teaching (Mubinabonu & Sohib, 2024). Authentic learning experiences are made possible in Virtual Reality (VR) environments, although, the cost and the required infrastructure limit access (Ranjan & Rana, 2023).

The use of digital tools is made more difficult by social and economic factors. Students and teachers from rural areas have issues with modern schools due to internet accessibility issues and not having the necessary equipment (Rasulova & Nizomova, 2024). The disparity in the

availability of funds for digital resources also widens the divide between urban and rural areas (Gulyamov et al., 2023). Moreover, where instruction is predominantly teacher-centered, there is significant sociocultural resistance to pedagogical shifts. Solutions include adopting public-private partnership models and local initiatives aimed at training teachers, as well as targeted campaigns aimed at raising digital literacy at the community level.

It has been emphasized that teacher training is crucial, as such training has improved teachers' self-esteem in the use of digital pedagogical instruments like storytelling and gamification (Abildinova et al., 2024). On the other hand, many teachers mention that the most meaningful integration of these tools is limited due to time and curriculum constraints (Ertmer & Glazewski, 2012). The gap between standard syllabi and the requirement of digital teaching is a good reason why policies should be more flexible. This lack of change is due to inadequate equipment and materials. Teachers need time and resources, which can only be provided through coordinated intervention from institutions and policymakers.

Soviet legacies in the historical and cultural context, especially one-directional lectures, greatly define the contemporary practices where students are expected to learn passively (Huisman et al., 2018). While some changes have been made after gaining independence, there is still significant resistance to changing traditional practices that have been difficult to break away from, particularly in the less accessible regions. The lack of a clear, long-term framework for professional development worsens matters. As Selwyn (2016) rightly states, integrating digital tools into education is not only a technical problem but also one of culture, policy, and pedagogical practice. That is why professional development should emphasize the socio-historical context of the region if it intends to achieve the desired impacts.

With regards to the sociocultural issues of Uzbekistan, the Uzbek education system has been undergoing some changes. Sociocultural issues are treated through sociocultural

frameworks, infrastructure development, and innovative materials and methods. The emphasis in this section highlights the need of comprehensive plans in Uzbekistan that attempt to combine education and technology with developmental processes in the country.

Challenges and Opportunities for Implementation

The main challenge to the application of digital resources to education throughout Uzbekistan, particularly in rural areas, continues to be the absence of relevant technology, including high-speed internet service (Rasulova & Nizomova, 2024). Even national initiatives such as the *Digital Uzbekistan 2030* strategy aimed at improving the technological infrastructure does not resolve critical access barriers, including the absence of necessary devices, connectivity, and technical support in most schools (Gulyamov et al., 2023). Regarding rural schools, the lack of access to computer labs, a stable power supply, and reliable internet access dramatically affects the quality of teaching as well as student participation in the digital learning ecosystem (UNESCO, 2020; Warschauer & Matuchniak, 2010).

Gulyamov et al. (2023) point out that financial and administrative resources continue to be concentrated in regions with better infrastructure and higher connectivity. In contrast, rural schools still face the challenge of having inadequate or absent infrastructure. These shortcomings deepen the digital divide and increase educational inequality (Selwyn, 2016; Rasulova & Nizomova, 2024). In low-income households, the inability to purchase digital devices results in reliance on teacher-led, lecture-based instruction, often excluding learners from digital pedagogical innovations (Tamim et al., 2011). This situation necessitates targeted community-based initiatives such as mobile internet labs, locally accessible training hubs, and subsidized device distribution—temporary solutions that can help mitigate structural barriers while long-term reforms take shape.

As previously stated, educators also struggle with having limited resources and time. Training has raised some awareness regarding the use of digital pedagogical tools, but practical support seems absent at implementation, especially when addressing the inflexible and cluttered syllabus (Abildinova et al., 2024). Sometimes, the application of technology shifts too far from the national curriculum, which leads to more work rather than positive pedagogical change (Ertmer & Glazewski, 2012; Voogt et al., 2012). Modern equipment is scarce, and instructional materials that incorporate digital tools are nonexistent, making classroom creativity impossible.

The absence of sustained support makes the initial training ineffective due to lack of follow-up assistance (Hanifah et al., 2022). Teachers are unable to execute and adapt their self-styled digital implementation plans which are cyclically proprietary and complex, constantly requiring alteration without sufficient or suitable professional development resources (Ertmer & Ottenbreit-Leftwich, 2010). There is a need to set up professional resource centers and teacher support groups to help bridge the gap between training and teaching (Rasulova & Nizomova, 2024).

Cultural resistance is also a critical barrier to the adoption of digital pedagogies. The knowledge-centered culture of education in Uzbekistan does not promote cooperative or constructivist approaches due to the Soviet legacy of teacher-dominated education (Tregubova, 2021; Huisman et al., 2018). Teachers are concerned that using digital tools would dilute the rigor of teaching, as they see technology as something supplementary in education instead of an integral part of teaching and learning (Selwyn, 2016; Cox, 2024). The combination of these competing forces often results in skepticism or superficial implementation of technological change.

Hanifah et al. (2022) and Selwyn (2016) argue that post-Soviet territory is less responsive to change and more resistant to ownership of change by implementing bottom-up incremental change strategies like action research, teacher workshops, and critical reflective practice. In the case of Uzbekistan, these approaches may facilitate easing contemporary cultural transitions regarding teaching and learning in a digitally rich environment.

Confidence in self-efficacy and self-reported digital competence are also vital for successful execution. In this instance, activity with technology in a teaching context is a new behavior, so according to Bandura's (1997) social cognitive theory, one must have confidence that one will utilize it. Teachers who feel capable tend to implement innovative practices (Ertmer & Glazewski, 2012; Hanifah et al., 2022). Despite this, many educators in Uzbekistan do not possess the necessary confidence or ingenuity to look beyond the most basic ICT utilization (Rasulova & Nizomova, 2024). Many training programs are successful when they provide practical application and case study components alongside the training (Voogt et al., 2012); however, these programs overlook the unique realities faced within the teachers' own contextualized classrooms.

A contributing factor to the problem is that some teachers lack the creativity to explore digital experimentation fully. Reflection strategies to encourage creativity can include digital portfolios where teachers record and reflect on their career progressions (Bazeley & Jackson, 2013; Voogt et al., 2012). Moreover, recognizing teachers through awards like innovation or team competitions may motivate them to work, thereby fostering the intrinsic motivation to become active participants (Craft, 2005).

Nevertheless, cost-related factors are major restrictions. More advanced schools, compared to those with limited budgets, face unique challenges in terms of maintaining training hardware, software, and upkeep training peripherals (Cox, 2024). A number of these institutions meet

their operational needs first and then consider spending on educational technology. In some cases, the financial burden of covering training or purchasing necessary tools is shifted to the teachers (Rasulova & Nizomova, 2024). These issues call for government aid as well as creatively scoped funding, such as through public-private partnerships or developing open-source platforms that reduce long-term costs.

Mobile technology is one of the potential untapped areas. The increasing number of smartphones and mobile connections in Uzbekistan suggests that digital learning mobile applications could be useful scalable and economical resources. In contrast, other scholars have pointed out the benefits of mobile technologies, such as Sam (2024), who addressed mobile learning and its role as an adaptable mobile tool for higher education in Cambodia. Game-based learning and adaptive programs like Duolingo are more socially and widely accepted, making it easier for different social classes to participate (Sam, 2024). Meanwhile, Google Classroom and Microsoft Teams support asynchronous and blended instruction, allowing students to work independently with little direct supervision (Rasulova & Nizomova, 2024). Field trips and virtual simulations are great ways to enhance students' creativity alongside experiential learning (Mubinabonu & Sohib, 2024).

However, the adoption of such innovations would require comprehensive national policies that aim to foster creativity in teaching and learning. These policies ought to be backed by partnerships between schools and universities, software firms, and providers of hardware and services to guarantee relevance (Gulyamov et al., 2023). Without this type of coherence, the most promising instruments can remain unused.

Although digitalization has developed in the education sector of Uzbekistan, the infrastructure, cultural attitudes, training of educators, and policy frameworks continue to lag behind. Addressing these gaps requires the establishment of an appropriate training program,

as well as an innovative and inclusive philosophy using digital pedagogy. This study attempts to fill these gaps by investigating how teacher candidates operate with digital pedagogical creativity and what institutional conditions are necessary to nurture it.

4.2. Development of Pedagogical Creativity

With regard to digital technologies, creativity means the infusion of technology as a change agent to stimulate engagement, thinking, or problem-solving (Csikszentmihalyi, 1996; Beghetto & Kaufman, 2014). The creativity in teaching should encompass the development of reasoning and problem-solving skills and not just focus on memorization (Beghetto & Kaufman, 2014; Robinson, 2011).

With the aid of digital tools such as digital storytelling and simulations, learners have the opportunity to creatively express themselves, while concurrently these tools be categorized as digital for that purpose (Greenhow et al., 2009; Henriksen et al., 2016; Selfa-Sastre et al., 2022). According to Mishra and Koehler (2006), these technologies help teachers to assist the learner's social and academic growth simultaneously. In this part, these tools and their consequences concerning teacher training, learner participation, and institutional participation are described.

Alongside the development of new pedagogical approaches, new educational tools, methods, and technologies are designed to enhance student participation and transform their educational experience (Bates, 2016; Greenhow et al., 2009; Akujieze, 2024). Robinson (2011) describes creativity as a 21st-century skill and suggests open-ended, exploration-based flexible approaches that facilitate invention and discovery. Likewise, Beghetto and Kaufman (2014) contend that digital media, in particular, helps support simulation, experiential, or group work. Creativity and independent thinking are supported when students interact with peers through problem-solving, thus fostering active learning through digital simulations and collaborative

platforms (Beghetto & Kaufman, 2014; Akujieze, 2024). In Uzbekistan, however, where resources are limited, access to these tools is highly unequal and becomes a significant obstacle for many. The value of the simulations is restricted without proper infrastructure and professional support (Akujieze, 2024; Warschauer & Matuchniak, 2010).

Collaborative tools are invaluable in facilitating active learning strategies that are constructive and self-directed by students (Barajas et al., 2018). It enables learners' creativity through peer teaching, sharing of ideas, and group problem-solving (Akujieze, 2024). Social constructivist pedagogical systems tear down the essential traditional restrictive barriers, and these platforms support these modes of teaching while Vygotsky's definition of learning as a socially mediated activity is well upheld. However, the employment of collaborative tools increases the expectation of a higher degree of digital competence and pedagogical adaptability from teachers (Mishra & Koehler, 2006; Henriksen et al., 2016; Barajas et al., 2018). Training regarding using and aligning the tools with the curriculum is critical for effectively using digital group tools (Ertmer & Ottenbreit-Leftwich, 2010; Akujieze, 2024). There is no substitute for ongoing professional development and institutional support for incorporating collaborative pedagogies into mainstream practice (Henriksen et al., 2016).

Mishra and Koehler (2006) discuss the TPACK framework as enabling and supporting templates for these personalized, flexible approaches where content was delivered using digital tools and pedagogy. This principle connects with the TPACK Framework which argues the integration of technological, pedagogical, and content knowledge is essential. However, in Uzbekistan, the accessibility of the digital equipment required for individualized and self-directed learning is mostly limited to urban, economically developed schools (Rasulova & Nizomova, 2024). This points out the gap for comprehensive changes such as budgetary

allocations and professional development for teachers so that all learners can access responsive, flexible pedagogies.

Digital storytelling is one of the best ways to nurture creativity, collaboration and critical thought (Moradi & Chen, 2019; Yang, Chen, & Hung, 2022). Such an approach to narrative construction includes storytelling and extends into multimedia production and, when well scaffolded, promotes reflective thought and digital citizenship (Schmoelz, 2018; Belda-Medina, 2022). In teacher training programs, the teaching of digital storytelling fosters creativity as well as reflection. Nonetheless, effectiveness relies on resource allocation and digital proficiency among the teaching workforces. In such underfunded schools, access to multimedia devices and their relative education is still limited, and as a result, storytelling cannot be integrated into teaching routines (Schmoelz, 2018; Belda-Medina, 2022). In addition to the skill development mentioned above, digital storytelling enables students to relate academic content with real-world context. This motivates them to become more engaged, learn more, and bridge the gap between theory and practice (Henriksen et al., 2016). Studies indicate that storytelling enhances digital literacy, collaboration, and empathy, particularly when centered around cultural diversity or disability-inclusive (Belda-Medina, -inclusive (Belda-Medina, 2022).

However, there is still a problem with implementing the stories in teaching practice, especially within teacher education programs that do not formally incorporate instruction with a media component. These institutions need to reconceptualize their approach so that they can design systematic training that combines pedagogical and technical assistance.

Henriksen et al. (2016) note that the re-envisioning of digital engagement in goal-oriented reasoning and motivation results in gamified learning, which offers new opportunities. While design intentionally, chaotic gamified interfaces have the potential to convert passive

breaks or transitions into active learning opportunities. Game-based platforms encourage learners to become more active participants in controlling their learning, reflection, and self-motivation. Simulations and games are often praised for their ability to engage students and improve the learning experience; and even so, some studies highlight concerns, particularly in the absence of teacher training or strong skepticism about their value (Tregubova, 2021; Huisman et al., 2018). These kinds of attitude issues illustrate the fact that attempts to use pedagogy innovations face challenges far more deep than the tools; it is a fundamental shift in the approach to teaching and learning that is needed. Nonetheless, not all studies report a favorable perspective regarding the application of digital creativity tools. For Ertmer and Glazewski (2012), the worry is that many teachers utilize these tools in a manner that is pedagogically empty. Correspondingly, Tregubova (2021) notes that even in the presence of such resources, teachers' negative attitudes and low self-esteem generate low pedagogical impact. These conclusions suggest that the adoption of tools requires more profound pedagogical changes. In Uzbekistan, because of the prevalence of conventional models of assessment, gamification is notoriously underused and poorly interpreted.

Digital tools are powerful aids in addressing issues of inclusivity, allowing a teacher and learner to engage with multifaceted angles. For instance, social challenges such as disability, emotional health, or cultural identity can be addressed with digital storytelling. Belda-Medina (2022) noted that pre-service teachers who underwent the digital storytelling workshop became more proactive towards practicing inclusive education and dealing with students who have special educational needs. Nonetheless, inclusion is not simply good intentions. It depends on factors such as having the relevant technology, adequate instruction, and the willingness of the teachers to incorporate diversity within the context of a digital environment. Implementing inclusiveness in pedagogical practices in digital environments requires profound professional training and policies that further fairness and inclusive design.

The development of creativity alongside technology can be achieved to a greater extent with holistic educational frameworks. Institutional encouragement towards innovation, pedagogy, and experimentation contributes to the prominence of educational practices (Henriksen et al., 2016). Project-based learning, interdisciplinary approaches, and technology-based design processes can offer such meaningful practice.

Moreover, these innovative approaches must be matched with firm policy, the proper infrastructure, and an adequate evaluation framework to achieve large-scale impact. Without such support, integrating technology and creativity may be shallow and counterproductive. As Henriksen et al. (2016) state, integrating new technologies into the education system should not be treated as an innovation by default.

To conclude, using creative pedagogy tools in digital environments refers to profound possibilities in achieving learner engagement, collaboration, inclusiveness, and many other aspects. However, effective integration relies on continuous support from the institution, adequate training of the teachers, and purposeful implementation of technology. Through addressing these intertwined issues, teacher training programs in Uzbekistan—and anywhere else— can reasonably assist educators with the creativity to integrate digital technologies in contextually fair ways. These understandings highlight how fostering pedagogical creativity is not the sole responsibility of one teacher. This references more profound holistic elaboration, which we will define next as digital pedagogical creativity (DPC) as a concept and course of action.

4.3. Digital Pedagogical Creativity

Digital tools, as Adeel et al. (2023) explain, promote students' creativity, collaboration, and problem-solving in the classroom. Studies on digital differentiation have shown that a student's motivation and creativity are found to be more significant in a personalized digital

environment (Sayı, 2022). Engaging students in narrative and multimodal forms of DST storytelling effectively integrates technology and communication (Schmoelz, 2018).

As Webb and Layton (2023) put it, the building block of creativity is a teacher's digital literacy. But in terms of instructional design, creativity is the addition of purposeful activity to pedagogical problems using the appropriate tools (Henriksen et al., 2016). In a more sociocultural vein, Glăveanu (2008) claims that creativity is no longer understood as an individual endeavor but rather as a phenomenon embedded within cultural and social participation, which is especially true in classrooms with high technology. This view is different from earlier approaches to creativity, for instance, the one by Guilford (1967), who regarded creativity as an ability that remains stable in an individual. Glăveanu (2008) puts forward a different view whereby, rather than being objectively determined, creativity is a phenomenon that depends on the existence of a particular culture or society. Understanding this change is fundamental for teacher education programs intending to promote digital creativity in collaboration and context.

Incorporating creativity in teaching requires pre-service or in-service training whose objective is to enhance the teachers' digital skills and pedagogical responsiveness (Zayas & Rofi'ah, 2022). Tang et al. (2022) showed that Google Classroom, Miro, and other collaboration tools for teachers stimulate learners' creative problem solving. The research conducted by Wisanti et al. in 2024 suggests that digital scientific poster tasks increase a learner's scientific creativity and conceptual understanding, which means that integrating creativity into an assessment design leads to better content mastery outcomes.

Digital Storytelling (DST) as a Creative Pedagogical Practice

Digital storytelling has emerged as one of the powerful pedagogical techniques in language education. The study emphasizes how DST is associated with greater stimulation and

participation because it transforms a conventional classroom into an active, student-centered environment (Yang et al., 2022). These students are directly involved in the construction of knowledge with the use of highly sophisticated and creative multimodal narrative forms like images, videos, and audio.

Yang et al. (2022) offered an explanation for how DST aids understanding and emotion-laden transforms of visuals related to the learning of a language. This is an extension of the TPACK framework, which integrates technology into pedagogy and content teaching for seamless lesson delivery (Koehler & Mishra, 2006). Likewise, Bates (2016), Greenhow et al (2009) have challenged some arguments against the misuse of technology and integration contending that learners; participation, interaction and engagement with the material is authentic when the integration is done appropriately.

Besides being a language learning resource, Adeel et al., (2023) wrote that DST fosters collaboration, co-feedback, and co-construction of meaning. Teachers need training in the design of multimedia documents as well as in the management of group behavior concerning the curricular outcomes that the curriculum guided service-learning technology seeks to achieve, Belda-Medina (2022) said.

Digital Pedagogical Creativity in Teacher Education

Many researchers emphasize the need to pay attention to the development of DPC within the framework of teacher education (Akujieze, 2024; Ahn & Oh, 2024; Henriksen et al., 2016; Barajas et al., 2018). Ahn and Oh (2024) illustrate changes in behavior regarding technology integration as design thinking courses change pre-service teachers' perceptions of active and reflective integration. Innovative suggestions for the application of digital

technologies for teaching from the perspective of the teachers are advanced by Barajas et al. (2018).

The application of DST shows its teaching ability (Belda-Medina, 2022). In project-based classes, students often use English in the context of the workplace by producing multimedia stories that integrate learning with reality (Yang et al., 2022). Students lacking prior exposure to public speaking often experience stress related to their performance. This can be approached through a scaffolding approach, starting learners with basic storytelling and progressing to advanced digital narratives.

Collaborative Creativity and Social-Emotional Learning

DST encourages creativity in working in collaboration with others, while Selfa-Sastre et al. (2022) noted that the co-creation of narratives fosters communication, problem-solving, and negotiation, which are important in academic as well as professional settings. Selfa-Sastre et al. (2022) assert that DST places learners during meaning construction and collaboration, as learners are required to manage emotionally charged concepts and apply high-order skills actively. Regardless, group work could still be negatively influenced by unequal distribution of work or too much loose control of the group. Teachers should structure and actively participate in the feedback process on group contributions so that all members of the group can develop and that every member has a voice. This illustrates how collaboration helps in promoting the want to take controlled action and shows enhancement of social and emotional learning (Yang et al., 2022).

DST is also relevant in promoting inclusivity and awareness of culture (Belda-Medina, 2022). Beginning with culture, disability, and feelings, teacher candidates begin to empathize and consider ways to design more inclusive classrooms (Belda-Medina, 2022). Different stories

help dismantle stereotypes, encouraging and nurturing a more humanitarian and thoughtful approach to teaching (Belda-Medina, 2022; Sawyer, 2012; Greenhow et al., 2009). However, the application of these strategies depends on training conducted on the faculty. Without training on diversity inclusion and teaching approaches based on difference, there is a limit to the equity that DST can achieve. It is important that these institutions focus on courses which merge digital imagination and creativity with inclusiveness.

DST for Creative Assessment

Unlike other methods of assessment, DST is more versatile and flexible. It gives educators the chance to assess students' imagination, engagement, and understanding of the topic in more genuine ways. Imagination can be evaluated based on how the story is structured, how original it is, and how multimedia elements are incorporated (Saltık Ayhanöz & Kahraman, 2023). At the same time, DST provides an unparalleled opportunity to measure language and digital skills at the same time. This is only possible by redefining assessment as an ongoing, fluid activity where multiple approaches are valued alongside team outcomes. There is a need to help teachers with the interpretation of complex digital artifacts in self-representation (Selfa-Sastre et al., 2022).

Problem-based learning (PBL) approaches that combine linguists and technologists can ease the transition. Interdisciplinary workshops offer a solution for educators unfamiliar with either the digital or language components of DST, helping bridge the skill gap and reducing implementation anxiety.

Institutional Support for DST

Institutional support is vital for DST to be viable in the long term and on a large scale. Teacher trainees who have practical experience with DST during their training are more

inclined to practice these strategies in their teaching (Shelley & Kiray, 2019). However, such methods cannot be sustained without dedicated infrastructure—such as digital storytelling labs—and professional supervision.

Implementation requires more than isolated initiatives. Policies, investment in infrastructure, and curriculum reworking must synergize to situate DST as one of the focal features of teacher education. Lacking such alignment stands the chance of being classified as an out-of-school pastime or as an overhyped trend instead of a practice seeking to change the system.

In conclusion, digital storytelling, as has been shown, is an example of how creativity in technology-based pedagogy is transformative. It combines art, language, and technology into a comprehensive model that encourages student participation, diversity, and authentic learning. The expectation to attain such ends, however, rests on devotion from the institutions, the advancement of the teachers, and the logical allocation of the curriculum. While the advantages of DST are known, the lack of adequate training, infrastructure, and a supportive policy framework are the barriers to its effective implementation. Efforts must be made to use DST within the scope of comprehensive educational change that addresses creativity, equity, and innovation in education for the 21st century. The real obstacle to the promise of DPC is how to support and prepare teachers, which will be the focus in the next part of the discussion.

4.4. Teacher Education and Professional Development

Professionals involved in teacher education must develop and implement advanced training methods to address the rapid digitalization of teaching and learning. This section analyzes how digital devices are being incorporated into teacher training programs, particularly within the organizational structures of institutions in Uzbekistan. Even though Western literature emphasizes the cross-national dominance of teachers' pedagogical authority in the

post-Soviet dominions (Silova, 2009), some local literature is equally concerned. For instance, Ruziev and Burkhanov (2018) point out that many of the reforms related to higher education in Uzbekistan tend to fail because of the firm faculty entrenchment and low institutional engagement. The analysis illustrates that there are cultural and systemic constraints on creativity and innovation in pedagogy and supports the argument. The goal is to determine what needs to be changed and what specific actions can be taken to effectively prepare teacher candidates to successfully cope with modern educational systems.

Ongoing Training Schemes and Aid

Uzbekistan has introduced some comprehensive and centralized training programs, such as MA EDIN, which adopt a creativity-centered framework grounded in Amabile's Componential Theory of Creativity (Amabile, 1983; Pozilova, 2023; Sullivan, 2017). This approach focuses on helping the candidate acquire domain knowledge and cognitive and motivational components of pedagogy for the meaningful use of technologies in teaching (Amabile, 1983).

The principal strategy of the program is PBL, which helps the students acquire knowledge through active engagement in real-world problem-solving while also helping them develop critical thinking skills (Abildinova et al., 2024). Nonetheless, there remain systemic gaps in infrastructure, especially in rural areas, that hinder the equitable participation in these programs and the training they offer (Akujieze, 2024). More work must be done to examine these innovations within various contexts throughout Uzbekistan to determine if they are scalable and adaptable.

To this end, tools such as Parlay Genie enable collaborative lesson planning as well as interactive digital teaching. Similarly, digital storytelling as a DST activity allows MA EDIN students to practice lesson design through simplified digitally mediated instruction. Moreover,

self-reflective practices and creative integration assessments are aided through digital teaching portfolios. However, routine program evaluation and benchmarking studies are necessary to ensure that these approaches continue to meet the changing demands of the education sector (Tregubova, 2021).

Bates (2015) states that teacher education should be designed around the three pillars of technology, pedagogy and content, which are also found in the TPACK model (Mishra & Koehler, 2006). Augmented reality (AR), gamification, and context-aware pedagogies offer scope for personalizing learning and for the constructive promotion of inclusive education (Ranjan & Rana, 2023). There are still many open questions related to adapting these innovations into a resource-deficient environment where the questions of localization and scalability become paramount.

Emerging Technologies and Training Gaps

Ranjan and Rana (2023) note that some innovations like virtual reality (VR) and Artificial intelligence (AI) would improve training by increasing visualization, automation, and differentiation of instruction. They can widen the scope for delivering creative and inclusive lessons by pre-service teachers. Such improvements may strengthen the digital divide in infrastructure and digital skills training (Akujieze, 2024). Long-term research could investigate the impact of immersive technologies on the learning process and readiness to practice of teacher candidates from Uzbekistan. Innovative education technologies have been brought to Uzbekistan by the international and local companies ClassPoint and ClassDojo, dramatically increasing engagement scope (Mubinabonu & Sohib, 2024). At the same time, there are differences between urban and rural areas. These changes will not happen unless there is some form of policy integration at the top and sufficient mentoring at the bottom within an

encouraging institutional setting that supports innovation, risk-taking, and career advancement (Rasulova & Nizomova, 2024).

Enhancing Teacher Education through Mobile and Online Tools

Mobile apps, websites, and VR simulators have enhanced and transformed language learning using new technologies outside the classroom in Uzbekistan (Mubinabonu & Sohob, 2024). Self-directed learners and users of the collaborative platforms are active participants of learning (Greenhow et al., 2009). The caveat is that use of these technologies is geographically unequal (UNESCO, 2020). There is a need to study the effectiveness of mobile-assisted teacher training resources in the context of varying populations of learners over time.

Teacher training is further strengthened through international exchanges that provide exposure to different teaching and technology systems (Makarova et al., 2021). However, these collaborations need to be placed within the local context. Adaptive strategies are important to maintain the effectiveness and usefulness of imported teaching models.

Systematic Support Services and Infrastructure

The effective integration of digital tools relies on high-quality infrastructure and effective support services. This is not the case in Uzbekistan, where disparities in access to broadband and devices impede the use of blended learning, especially in rural schools (Rasulova & Nizomova, 2024). These burdensome gaps can be solved by targeted funding alongside appropriate governance changes to eliminate the rural-urban digital divide (Gulyamov et al., 2023). Some of these gaps can be closed using inexpensive mobile technologies or low-bandwidth solutions. Using mobile platforms to deliver training helps to ensure rural participants do not miss out.

Administrative policies must also accompany the digital transformation agenda. A mixed-method approach using structured frameworks, incentives, and performance targets was used to motivate teachers to be more innovative with their practices (Sullivan, 2017). Some programs, such as MA EDIN, have shown how integrated curricula with digital pedagogy help in teaching professional and academic skills (Abildinova et al., 2024).

Sustainable Professional Development and Mentorship

Structured professional development must be continuous, reflective, and embedded in frameworks such as TPACK (Baran et al., 2011; Voogt et al., 2012; Henriksen et al., 2016). Virtual reality, DST, and gamified learning should be part of practical workshops, enabling candidates to experience the real-time impact of technology on pedagogy (Mubinabonu & Sohib, 2024). Abildinova et al. (2024) elaborate on the nurturing of innovation and imagination with the cases of peer learning communities, mentoring programs, and collaborative lesson plans with teaching candidates.

To address geographical disparities, institutions must broaden the scope of online training as well as establish relations with technology providers. Local firms can create inexpensive, appropriate, and culturally specific digital devices, while overseas partnerships may offer access to sophisticated technologies (Mubinabonu & Sohib, 2024). It is important that these devices are evaluated through action research to determine their contextual relevance and effectiveness. Sustainable change is also needed to build up the required infrastructure support, purchase of digital resources, and training teachers to further support sustainable development.

Evaluation and Institutional Leadership

Regular evaluation mechanisms such as surveys, focus groups, and digital portfolios can track the development of digital pedagogical creativity (Ifenthaler & Schweinbenz, 2016). Formative and peer assessment methods can help institutions adapt training programs in real time and tailor support to candidates' needs (Branch & Merrill, 2012).

Innovation will not be achieved without transformational reality. Institutions that invest in integrating technology foster innovation with teaching in the classroom (Rasulova & Nizomova, 2024). These institutions undoubtedly possess the participatory culture of embracing innovation. Therefore, design training should be one of the priorities in teacher education reforms.

In conclusion, these systemic and institutional supports are critical to the success of teacher education in a digital age. Changes in infrastructure, efforts in professional development, and a supportive organizational environment will allow more imagination and equity when integrating technology into teaching for new teacher candidates. If policy, training and infrastructure are dealt with in an integrated manner, Uzbekistan's education system would be able to prepare educators for the challenges of the 21st century learning environment and make a positive impact on the national education reform.

Summary of the Literature Review

This review of the literature considered how digital resources and creative approaches to teaching interact with the preparation of teachers, and their interactions were considered to improve student participation, creativity, and critical thinking. Nevertheless, in all four domains, there is evidence in the literature of persistent structural, cultural and institutional barriers that make it difficult to operationalize—especially in transitional contexts like Uzbekistan.

1. Integration of Digital Tools in Education

Adopting new digital tools in education has increased significantly over the past few years, supported by TPACK models, which describe the relationship between content, pedagogy, and technology integration. While some scholars, for example, Voogt et al. (2012) and Tamim et al. (2011), recognize the success that blended and mobile learning environments offer, there is still a lack of necessary infrastructure and access to digital services out in the hinterlands and poor areas (Warschauer & Matuchniak, 2010; Gulyamov et al., 2023). Many scholarly works make this assumption of the existence of basic equipment needed for teaching in many countries of the Global South, which is rather not the case. This poses doubts on scalability and equity, especially in post-Soviet countries like Uzbekistan, where there are many ongoing and incomplete structural reforms.

2. Development of Pedagogical Creativity

Robinson's (2011) argument, as well as that of Beghetto and Kaufman (2014), confirms the importance of creativity in pedagogy, and there are many forms of advanced technologies that can effectively increase the participation and involvement of the learners. Nevertheless, there is a powerful advocacy for digital storytelling, gamification, and simulation, and still, most of the audience evaluates the processes instead of the outcomes, focusing on how to incorporate these practices into the inflexible curricula that prioritize examinations. Furthermore, there is minimal discussion on the degree to which institutional constraints, such as standardized examinations and traditional hierarchies of the classroom, can result in the teacher's passive adoption of creative uses of technology. The review indicates that in the absence of such reforms in the curriculum and long-term policy support, digital creativity will continue to be a peripheral aspect rather than a central component of the educational practice.

3. Digital Pedagogical Creativity (DPC)

DPC provides a promising paradigm for rethinking creativity in the context of the digital world. Tools like Digital Storytelling (DST) are underscored for their capacity to combine narrative, visual, and technological literacy (Yang et al., 2022; Schmoelz, 2018). The literature appreciates DST's pedagogical advantages of motivation, participation, collaboration, and inclusion. Yet, too little attention is often given to the necessary teacher preparation, digital infrastructure, and time investments that may be required. Moreover, Glaveanu (2008) challenges the individualistic approach to creativity, arguing that more socially embedded perspectives must be considered. This indicates that some teacher training programs need to go beyond teaching the use of tools and attend to the socio-cultural aspects of creative practices in the digital environment.

4. Teacher Education and Professional Development

Uzbekistan's MA EDIN is cited as an example of a teacher preparation program that incorporates technology and creativity, which can be commendable. However, as with other programs, there is no coverage of the long-term effects of such programs, which leads to information on their impact being very shallow. Indeed, professional development is considered important (Ertmer & Glazewski, 2012), but there rarely seems to be any form of support in the greatly underfunded institutions. Numerous studies center on the "what" of using technology, but not nearly as many look at the "how," which refers to the planned changes in policy, culture, or leadership necessary for fostering innovative digital teaching and integration. In addition, the existing research material fails to adequately include the perspectives of the educators, particularly those from the eastern regions, creating a void in our comprehension of how digital methods are constructed and contextualized in a particular region.

Literature agrees on the importance of technology in education, especially in fostering creativity in teaching. Still, it pays little attention to the interrelations and interactions between policy, infrastructure, teacher agency, and organizational culture. An adequate context within which these tools and frames will work is responsiveness, culturally appropriate practices and non-discriminatory access to all. There is an urgent need for research beyond documenting innovations towards interrogating the processes and the systems that build barriers to the innovations, more so in transitional systems such as Uzbekistan. For there to be a meaningful and sustained change in digital education, transformative, reflexive and inclusive schooling must be enacted and lived by the educators and students of the educational systems.

5. Statement of the Problem

Introduction

The increasing use of digital devices and instruments in education across nations has created enthusiasm for understanding how these can enable innovative student-centered teaching approaches. Digital pedagogical creativity (DPC) concerns the application of technology by educators to support the development of rich, engaging, and challenging learning activities (Mishra & Koehler, 2006; Harris & Hofer, 2009). Most research has focused on digital pedagogy and teacher digital competence in relatively well-resourced and often Western countries (Voogt et al., 2012; Selwyn, 2016). There is scant literature on how teacher candidates from post-Soviet countries, such as Uzbekistan, understand and enact digital creativity as a teaching component. This research aims to fill this void by analyzing the teacher candidates' narratives within a creativity-centered MA program in Uzbekistan.

Uzbekistan has implemented a wide array of educational reforms since it became independent in 1991. One of the pillars of this reform is the Digital Uzbekistan 2030 strategy which aims to increase the level of digitization and technological application in educational processes (Presidential Decree PF-6079, 2020). Nonetheless, as with most systemic issues, the lack of adequate infrastructure, adequate teacher training, and a pervasive culture of teaching dominated by traditional methods remain hurdles to the effective adoption of creative digital teaching strategies (Ruziev & Burkhanov, 2018; Eickelman, 1998).

5.1. Research Gap

As global literature focuses on the advantages of merging technology and creativity in education (Mishra & Koehler, 2006; Tamim et al., 2011; Ertmer & Glazewski, 2012), this is primarily located within high-income countries with developed digital systems. There is little available primary literature on how these frameworks function in practice within low-resource,

transitional settings, especially in Central Asia. In Uzbekistan, teacher training continues to be dominated by post-Soviet pedagogical styles and rigid-bound education systems (Silova, 2009). Although national strategies like Digital Uzbekistan 2030 aim to promote the integration of technology, there seems to be a disjunction between what is established and what takes place (Warschauer & Matuchniak, 2010; PF-6079-son, 2020).

Existing research notes that even teachers who claim to be digitally skilled in Uzbekistan frequently do not possess the essential materials, professional freedom, or organizational assistance necessary for the meaningful use of DPC (Greenhow & Robelia, 2009; Bates, 2016). So far, no research has been conducted that focuses on how teacher candidates perceive and perform digital pedagogical creativity within the context of the epistemic community and institutional framework of Uzbekistan. This research aims to fill this gap by exploring how novice teachers transform policies that emphasize digitization in education using digital pedagogical creativity.

5.2. Purpose of the Study

This research aims to determine how pre-service and novice teachers in Uzbekistan exercise and demonstrate digital pedagogical creativity during their professional training and teaching practice. This study seeks to:

1. Examine teacher students' conceptions and their practices of DPC.
2. Assess the culture, institution, and infrastructural factors that facilitate or hinder the adoption of creative digital approaches.
3. Develop DPC integration strategies for teacher education and policy frameworks in Uzbekistan and offer context-specific suggestions.

The study enhances both theory and practice regarding the pedagogy of creative and flexible teaching in the context of information technology integration in changing education systems.

5.3. Significance of Study

This research is significant at the following levels:

- ❖ For curricula designers and policymakers, it documents the institutional and cultural factors necessary for embedding DPC in teacher education programs and thus informs policy.
- ❖ For teacher educators and professional development trainers, it exposes the lack of sufficient training and support for educators' creative and critical use of digital tools.
- ❖ Global education discourse addresses the gaps identified in the digital pedagogy literature by providing examples from an under-researched context that post-Soviet or Global South education systems can utilize.
- ❖ It enhances teacher trainees' voices and experiences in pedagogical reform as it relates to agency, creativity, and digital equity.

The study responds to the Digital Uzbekistan 2030 initiative by guiding the infusion of digital creativity into the teacher education curriculum, making it possible to concretely and contextually ground the reforms.

5.4. Research Questions

1. What do teacher candidates know about digital pedagogical creativity and its impact on teaching and learning?
2. How do teacher candidates define and apply digital pedagogical creativity in their own teaching?
3. What are the effective digital pedagogical creativity strategies that have been employed by teacher candidates?

6. Methodology

6.1. Research Design

The present study is qualitative because the aim of this study is to identify the impressions and experiences of pre-service and in-service teachers regarding digital pedagogical creativity at a university in Uzbekistan that focuses on a creativity-centered program. It captures how deeply and to what extent teachers and educators understand and utilize technology and creativity in their practice to make teaching more effective (Creswell & Poth, 2016).

The framework that enables listing boundaries was a case study that set its boundaries around a creativity-focused teacher education program in Uzbekistan (Yin, 2009; Stake, 1995). This methodology is apt for almost every educational phenomenon, as it uses multiple sources of data without being restricted to a particular context of an issue. This method is beneficial in studying how teacher candidates incorporate digital creativity into their teaching pedagogical practices (Merriam, 2009).

The participants were chosen through purposive sampling to ensure that they had direct interaction with the digital creativity aspects of the MA EDIN program. A total of 30 participants, consisting of 15 pre-service and 15 in-service teachers, were selected according to their participation in creativity courses and their application of digital aids in their coursework. Data collation was done within three months, from October to December 2024, per the academic calendar, to maximize the convenience of participants.

For the qualitative data, NVivo software was used for systematic analysis. All transcripts of the interviews and focus groups were uploaded in NVivo, and coding was done with the aid of inductive thematic analysis. Nodes were developed from themes, and queries were employed to capture patterns and the co-occurrence of codes. Researcher memos in

NVivo documented the analysis and methodological thoughts and therefore added to the audit trail and process transparency (Bazeley & Jackson, 2013).

This research proposes how teacher candidates in Uzbekistan are educated for digital pedagogical creativity using the TPACK framework, Amabile’s Componential Theory, and Csikszentmihalyi’s systems model. The proposed framework considers ethnic background and heritage traits that shape one’s institutional setting, including professional development, accessibility of materials, and societal views toward innovation and creativity.

Participants

The study uses the purposive sampling method, as described by Patton (2014), to enlist teachers and pre-service teachers who are part of a creativity-driven university course in Uzbekistan. This method guarantees the participants sufficient knowledge, skills, and experience in digital pedagogical creativity.

The selection criteria include:

- ❖ Enrollment in the MA EDIN program
- ❖ Experience with digital technology in an academic context
- ❖ Readiness for interviewing and engaging in focus group conversations

Recruitment was done using ethical research procedures, including sending invitation emails that contained informed consent (Creswell, 2016) (Appendix A). Participants were recruited through public announcement and social media channels within the MA EDIN program.

Table 2. Participant characteristics

Category	Description
Total Participants	30
Participant Types	15 pre-service teachers 15 in-service teachers

Gender Distribution	22 females, 8 males
Age Range	23-45 years
Educational Program	MA in Education and Innovation (MA EDIN)
Teaching Experience	0-18 years (varied among pre- and in-service)
Mode of Participation	Zoom (interviews and focus groups)

Table 2 highlights the characteristics of participants, including a complete range of pre-service and in-service teachers enrolled in the MA EDIN program. There is an even distribution of age, years of experience teaching, and educational qualifications among the participants.

6.2. Data Collection Methods

Data was collected through semi-structured interviews with teacher candidates, focus groups with students in the same section, and analysis of digital artifacts.

Semi-Structured Interviews

As indicated in the preceding chapters, semi-structured interviews are the primary method of qualitative data collection conducted as opposed to free interviews, which enable them to ask systematic questions and provide the opportunity to pursue new relevant ideas (Kvale & Brinkmann, 2009). This digital creativity semi-structured interview was conducted via Zoom with 30 participants, and for 20-30 minutes, their perceptions of the concept of digital pedagogical creativity, their barriers, and the ways to practice digital creativity in teaching were discussed (provided in Appendix B).

Focus Group Discussions

Focus groups enable participants to interact amongst themselves allowing for exploration of the notions of digital creativity in teaching. This promotes interaction and discussion that may not take place during individual interviews (Krueger, 2014). This method

is selected because it enables participants to share their experiences and perspectives in a collaborative environment, which can lead to richer data and a deeper understanding of shared challenges and solutions. The focus group questions (outlined in Appendix C) are designed to stimulate discussion on the creative use of technology in education, encouraging participants to collectively devise solutions and share best practices. Focus groups were conducted in three sessions with the same interview participants but studying in the same section. These are particularly valuable in this study as they provide insights into how cultural and social dynamics influence the collective understanding of digital pedagogical creativity.

Digital Artifact Analysis

Bowen (2009) argues that the analysis of documents is crucial in verifying the primary evidence gathered in the field. This involves triangulation of the information spent in the study. Supplemental components sought for document analysis include students' digital artifacts. A total of 55 digital teaching materials, including videos for digital storytelling, presentations in Canva, and interactive teaching aids (Miro and Padlet projects), were collected. During their coursework, participants created digital materials that they assumed would be beneficial for their lessons. The artifacts were assessed following three considerations:

1. Creativity (Amabile's Componential Model)
2. Innovation in Pedagogy (with TPACK Model)
3. Engagement in Learning (through self-evaluation of participant)

Combining these data sources increases the validity and applicability of the research results.

6.3. Data Collection Procedures

1. Initial Point of Contact: The data collection process began with an initial contact through email invitations, as outlined in the recruitment script. The email included information about the study, its purpose, and what participation involved. Participants

were electronically sent emails soliciting their participation and information detailing the study (Appendix D).

2. Informed Consent: The participants received the informed consent form, which they reviewed and signed before participating (Appendix E). Consent forms are signed before the data collection commences (Tracy, 2010)
3. Scheduling of Interviews and Focus Groups: Once participants had consented to participate, interviews and focus groups were scheduled at times convenient for them. Participants were allowed to choose between in-person or Zoom meetings to accommodate their preferences and availability. During the semi-structured interviews via Zoom that lasted for 20-30 minutes, the researcher followed the interview protocol (Appendix B), asking participants about their experiences with digital pedagogical creativity. The researcher was also prepared to ask follow-up questions to explore specific issues in greater depth. All interviews were audio-recorded with participants' consent to ensure accuracy during transcription. Focus group discussions followed a similar protocol (Appendix C). The researcher facilitated three focus group discussions with 7-8 participants via Zoom meetings, encouraging participants to share their views on the creative use of technology in education. The focus group sessions were recorded, and participants were informed of this at the start of each session.
4. Data Capturing: Interviews and focus group discussions are recorded with participants' consent to capture the correct information.
5. Transcription and Checking: After the data collection was complete, participants were thanked for their contributions and allowed the opportunity to review the transcripts of their interviews or focus group discussions for accuracy (Creswell, 2013). They were

also informed of the next steps in the research process and how the findings would be shared.

6.4. Data Analysis Procedures

Verbatim transcriptions of interviews and focus groups based on thematic analysis (Braun & Clarke, 2006). The coding strategy was inductive, grounded in the data, and not driven by pre-existing theory frameworks. Identified patterns, co-occurring data, and thematic relationships among responses were enhanced using NVivo's tools for data organization and management.

A rigorous process for data analysis was used to ensure the credibility and trustworthiness of the findings. For analysis of the qualitative data collected from interviews and focus groups, a thematic approach process described by Braun and Clarke (2006) was used, which includes:

1. Content—transcripts of verbal interviews or focus groups with audio recordings. Transcripts were edited for clarity.
2. Familiarization: The researcher was immersed in the data, by reading and re-reading the transcriptions.
3. Coding: Initial coding included identifying substantive lines, sentences or paragraphs (categorical statements) that respond to the research questions. Coding was developed inductively from the data, reflecting participant meanings and interpretations. Key patterns and themes as they reoccur in the data are identified (Saldaña, 2021).
4. Theme Development: Codes were reviewed for common patterns and similarities - resulting in higher-order themes. These represented the key ideas and relationships in data. Participants' codes are put together on one basis to create overarching themes.

5. **Review and Refinement:** An iterative analysis allowed clearer themes to emerge. The themes were reviewed to refine their definitions and ensure that they reflect meaning units. This process is where the themes are tested against the coded data extracts and the data to make sure they make sense. The researcher actively engaged with the codes in NVivo. The analysis followed an open and axial coding model, operationalizing preliminary themes into more permanent categories and overarching axes. Key participant groups, such as pre-service and in-service teachers, with central concepts like creativity, barriers, and digital confidence, were analyzed with NVivo's matrix coding settings through memos and word frequency. Analytic decisions within memos and annotations created a transparent audit trail.
6. **Defining and Naming Themes** - Each theme was clearly defined and named to capture its essence. Detailed descriptions of each theme were developed to explain their significance and relationship to the research questions.
7. **Interpretation:** The findings are brought into the context of the literature and frameworks already developed.
8. **Report Writing** - The last stage of the process that combines these themes into a cohesive story answering the research questions. Direct quotes from participants throughout the report provide examples and proof for points being made in the analysis.

Data systematization, organization, and NVivo software coding make the analysis more credible and systematic (Bazeley & Jackson, 2013). The results of this thematic analysis will help modify the teacher education curricula in Uzbekistan. This study helps programs such as MA EDIN devise approaches to professional development by determining particular gaps in teachers' comprehension and application of digital creativity. In addition, the emerging patterns from the digital artifacts and the transcripts of the focus group discussions can be used to

develop specific workshops, curriculum changes, and organizational changes for instigating technological literacy as well as creative pedagogy.

Development and Validation of Instruments

Questions for the interviews and focus groups are based on a literature review and in line with the research aim. Tools were reviewed by experts in digital pedagogy to measure their accuracy, and then they are used in a small-scale study for feedback.

Trustworthiness & Rigor

We verified the results obtained through interviews, focus groups, and digital artifacts by utilizing triangulation methods. Participants checked summaries of their responses for accuracy during the member-checking process. Two independent researchers analyzed data through separate coding and then corroborated them for inter-coder reliability.

6.5. Ethical Considerations

This research observes ethical procedures in research as approved by the Institutional Review Board (IRB) of Webster University. Ethical measures encompass the following:

- ❖ Confidentiality: Participants are treated in a way that makes it possible to link them to any information provided (Tracy, 2010).
- ❖ Participation: Participants are free to withdraw from the research study at any point in time without facing any form of punishment.
- ❖ Information Protection: Audio recordings and transcripts are securely packed and can only be accessed by the research team.

Moreover, ethical responsibility was upheld through self-critique of the researcher's identity and biases during the study. A reflexive journal, member checking, and inter-coder reliability checks were used to prevent the oversimplification of the issue from the researcher's point of view. These measures ensured that the analyses did not inflate the researcher's perspective, allowing participant voices to be primary.

Researcher Positionality, Reflexivity, and Bias

Positionality

The current roles I occupy as an Uzbek researcher and educator, along with my work experiences in English language teaching, teacher training, and educational leadership, inform the way I consider Digital Pedagogical Creativity (DPC), particularly in the context of its application within my home country, Uzbekistan. As a former senior teacher of English, teacher trainer with UzSPIC, and program director at Webster University Tashkent, I understand the prospects and challenges of digital pedagogy in Uzbekistan.

Working with both pre-service and in-service teachers, I understand how much digital tools can help spark creativity. At the same time, creativity in digital pedagogy is less achievable due to factors like insufficient institutional support, absence of digital literacy instruction, and low levels of technological access. My involvement with the British Council Uzbekistan has made me more supportive of the idea that teachers need professionally oriented programs that guide them through the necessary digital skills for teaching.

Reflexivity

As a researcher and educator, I must balance self-reflection with analyzing the experiences of teacher candidates in digital pedagogy courses. While I support the use of creative and technological teaching, I must consider other positions, such as opposition to digital tools, pedagogical conservatism, and the difficulties encountered by many teachers in developing countries.

To ensure that my positionality did not affect the results of the study, I incorporated methodological rigor through triangulation through interviews, focus groups, and an analysis of digital artifacts. Furthermore, I incorporated members' narratives without my own narratives, vying to understand their experiences and let them define the conclusions of the study.

Researcher Bias and Ethical Considerations

Because of my experience, I note some possible biases that could be present for data interpretation as it pertains to having an affiliation with the DPC, which could result in a bias of appreciation and over-acceptance of the creative uses of innovative digital tools. Moreover, being affiliated with international education programs, instead of educators trained in Uzbekistan's more traditional systems, could lead to some bias in the other direction. Also, adhering to educational reform may affect how I conceive institutional obstacles versus seeking to justify the needed policy change.

To address these biases, I have kept a reflexive journal that captures my changing views over time as I report my experiences. I also ensured that the opinions of the participants were in the foreground of the analysis and not my assumptions. Finally, I provided an equal discussion on the advantages and disadvantages of DPC implementation in Uzbekistan.

Through the lens of my positionality, reflexivity, and biases, I offer an integrated examination of digital pedagogical creativity in the realm of teacher education in Uzbekistan that is contextually rich and critically answerable.

Conclusion

Using the multiple-case study strategy and various qualitative data sources, this method worked well in capturing and understanding the phenomenon of digital pedagogical creativity within teacher education programs. By capturing the voices of educators in Uzbekistan, this study provided valuable insights into the challenges and opportunities associated with integrating digital creativity into educational practices. The results will help to understand the processes of integrating digital creativity in teaching and shape policies and practices within similar education systems internationally.

7. Findings

This section highlights the most important findings from analyzing the qualitative data captured through interviews, focus group discussions, and digital artifacts. The analysis of the interviews was done using Braun and Clarke's (2006) methodology. The themes were interpreted in coded interviews, focus groups, and digital artifact data. The primary supporting themes and participant quotes are provided in this section. The findings are organized into subsections: Overview of key findings and thematic analysis with patterns and trends corresponding to the research goals. This format explains how digital pedagogical creativity (DPC) is understood, practiced, and affected by the institutions and the society within the context of teacher education in Uzbekistan.

7.1. Overview of Key Findings

The results of this analysis provided a new understanding of how academic participants, both current and active in the MA EDIN program, perceive, practice, and live through digital pedagogical creativity within their professional work. Data analysis yielded three key findings:

1. Positive Views on Digital Pedagogical Creativity:

Most participants expressed the belief that digital pedagogical creativity enabled them to foster constructive teaching with active student participation, interaction, and challenging thinking, moving away from traditional lectures.

A few participants pointed out that using computers and other digital tools enabled students to participate in knowledge construction, marking a shift from teacher-centered to student-centered pedagogy.

2. Implementation of DPC Depends on Personal and Institutional Resources:

Despite appreciating the importance of DPC, participants could not apply it fully due to a lack of institutional backing, resources, and confidence in teaching staff.

Younger instructors and those who came from creativity-based training programs had higher rates of digital tool usage. In comparison, older educators stated that there needed to be an equilibrium between stringent use of pedagogy and teaching with technology.

3. Highlighting Contextual and Structural Issues—Ongoing Barriers:

Despite the good disposition for DPC, quite a few participants pointed out the lack of adequate digital literacy training, professional development, and the urban-rural gap as some of the persistent issues. Outside access to technology, primarily through rural schools, became the central issue, restricting educators from successfully employing DPC. Although some respondents were doubtful about the relevance of creativity for some subjects, this demonstrates the gap between creative thought and existing, more traditional academic requirements.

These results collectively show a contradiction. Although the use of digital devices may foster creativity and learning, a lack of conventional means and context-oriented issues continue to dictate how teaching candidates use digital pedagogical creativity in the practical context.

three research questions. Findings stem from three main themes: *Understanding of Digital Pedagogical Creativity, Application of Digital Pedagogical Creativity in Teaching, and Challenges and Effective DPC Strategies*. The impact of the MA EDIN program on participants' digital pedagogical competencies is analyzed separately due to its distinctive impact. Each of these themes emerged from a systematic coding of NVivo and is supplemented with participant quotations to clarify analytic meanings.

Table 3. Themes and codes for the project

Themes	Codes	Files	References
MA EDIN Program Training		21	40
	Curriculum Design Course	2	2
	Design Thinking and Creativity Classes	11	18
	Digital Storyboarding	10	11
	Global Citizenship Projects	1	1
	Integrated Studies	7	8
RQ1-Understanding of DPC		33	116
	Benefits of Technology	8	11
	Creativity Development	21	35
	Designing Lesson	13	16
	Engagement and Motivation	21	28
	Innovative Teaching Methods	25	26
RQ2-Application of DPC in Teaching		32	128
	Practical Integration of Digital Tools	27	44
	Digital Tools for Engagement	17	21
	Gamification and Quizzes	19	27

Themes	Codes	Files	References
	LMS in Learning	4	4
	Personalized learning	16	21
	Retention and Interactive Learning	5	5
	Teacher-student interaction	6	6
RQ3-Challenges and Effective DPC Strategies		33	217
	Challenges with Technology	31	47
	Evaluation of DPC	19	26
	Future of DPC	32	38
	Interactive platforms	14	19
	Learning Curve and Time Management	11	15
	Sharing and Learning	15	30
	Training and Workshops	26	42

Theme 1: Understanding Digital Pedagogical Creativity

This data addresses how teacher candidates understand and think about digital pedagogical creativity, responding to RQ1. The data shows that participants have a predominant perception of creativity not as a hallmark characteristic of any one person but rather as a relational phenomenon that arises under collaborative, co-design, and peer engagement conditions. They displayed this phenomenon not only in their classroom activities but also in the digital artifacts they created. Instead of just incorporating digital resources within teaching to enhance instruction, participants viewed the need to think beyond the normal scope of technology and strategically employ it when pedagogy is being practiced. This is consistent with Mishra and Koehler's (2006) framework of Technological Pedagogical Content Knowledge (TPACK) where technology, pedagogy, and content are used in practice in a new way.

As an example, P-22 explains, *“My understanding of digital pedagogical creativity is the usage of digital platforms and tools to conduct classes creatively. As time passes, schools are becoming the most boring places due to traditional methods that are being used there, and being creative is restricted by some rules. New digital platforms allow us to be more innovative and creative with the help of them.”* In the same manner P-16 put it, *“To me, digital pedagogical creativity is discovering new digital platforms, staying open-minded to the possibilities, and committing to learning about these different resources. Using a variety of digital platforms with digital innovation in the classroom will help keep students focused.”*

This resonates with the findings of Mishra and Koehler (2006) on the TPACK framework, where it was argued that teachers need to integrate the three components of technology, pedagogy, and content knowledge in an innovative and non-conventional way. The necessity of creativity in digital pedagogy has also been covered in the work of Sawyer (2012), where he touches upon the theme of creative teaching. It states that real learning happens when teachers employ technology to promote solving problems and thinking critically.

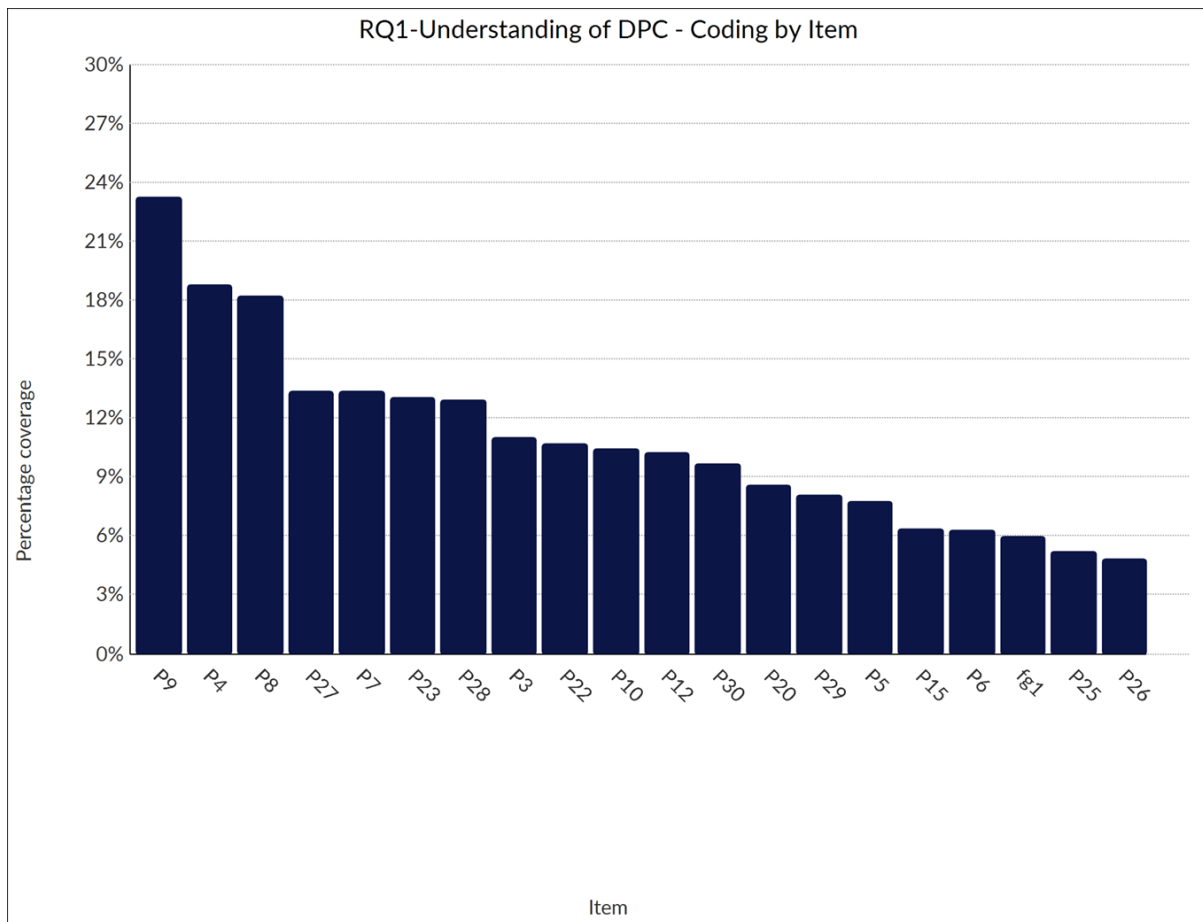
Participants noted the transformative possibilities that digital tools carry for enhanced creative teaching. One interviewee (P3) said, *“I think both teachers and learners have experienced a great transformation in terms of learning style, collaboration, access to resources, and format of the process. For instance, by using a vast amount of multimedia tools, teachers can make their lessons more engaging. They have got a chance to create real-life content which is beneficial for learners to remember easily.”* Equally, another participant (P14) noted the importance of engagement in digital storytelling: *“Since I am teaching Biology, most of the students think that the subject is generally boring. Resources such as books, PowerPoint, videos are not sufficient to convey the topic in a more creative and dynamic way. If a topic on dissection lacks an actual specimen or to further enhance or reinforce an understanding of basic human physiology, I utilize MozaikWeb for a more in-depth and visually stimulating*

approach.” These answers indicate that teachers acknowledge digital pedagogical creativity as a way of increasing engagement, which is in line with Sawyer’s view (2012) that educational creativity needs to be integrated because students have problems working collaboratively using technology.

In any case, the impact of this finding can be transformative in the context of education because it represents the movement from passive learning towards more active learning centered around the learner. This is important, especially for students from disadvantaged backgrounds who often do not benefit from these types of teaching; instead, they excel in learning in a contemporary interactive and creative way.

Furthermore, some educators stressed flexibility and customization as significant advantages of digital tools. P-20 noted, *"Lessons can be tailored to suit the needs of the students and the topic being taught. The possibilities available to creatively use technology during lessons to enhance learning, practice problem-solving skills, and collaboration are potentially endless. From using HyperDocs for project work or topic research to the use of reinforcement tools like Plickers or Kahoot to do a quiz, there is a tool for all manner of situations within a lesson."* As Sayı (2022) suggests, the concept of digital differentiation strategies is because customizing the student’s digital user environment increases motivation and creativity. This is especially significant in the case of Uzbekistan, where traditional pedagogical practices based on memorization are still prevailing. There are positive signs toward more imaginative and student-focused teaching and learning, and this shift is vital for future educational systems.

Figure 4. Theme 1-Coding by Item



Theme 2: Application of Digital Pedagogical Creativity in Teaching

Addressing RQ2, this theme looks at the impact of digital tools on the experiences of participants' confidence and competence in the creative use of digital tools in their teaching. In their responses, educators reported the most significant levels of engagement with a wide range of digital tools. The most used methods included collaborative platforms (Canva, Miro, and Padlet), gamification tools (Kahoot, AI-driven quizzes), and multimedia learning techniques such as digital storytelling. These findings are consistent with existing literature, which mentions attention to blended collaborative learning environments as a source of creativity (Yang, Chen, & Hung, 2022).

One participant (P12) described the benefits of using Miro for interactive learning: *“We worked on this project collaboratively using Miro within the Design Thinking class. It was the*

first time I did this, and it was a great way to organize ideas visually." Similarly, another educator (P15) relayed their perspective on formative assessments, stating, *"Using Kahoot is a great example of digital pedagogical creativity! Beyond that, I've incorporated interactive whiteboards for collaborative brainstorming and visual notetaking, creating engaging videos to explain complex concepts, and utilizing online platforms for peer feedback and collaborative writing assignments."* These insights reinforce studies by Greenhow et al. (2009) that when digital tools are effectively utilized, student interactions increase, and knowledge retention is maximized.

Digital storytelling was a beneficial strategy for learners as it allowed them to creatively and technically construct meaning. P-25 stated, *"I incorporate digital pedagogical practices, such as digital storytelling in history classes. This might include using YouTube videos to explore historical figures or events. I also utilize game-based learning platforms like Kahoot, which supports individual and group activities."* Learners' experiences substantiate the claims made by Moradi and Chen (2019) regarding the ability of digital storytelling to further enhance students' comprehension, motivation, and critical thinking activities. As multiple respondents provided, professional development programs are necessary to enable more effective use of DST and other digital pedagogical tools.

A second theme that arose was a shift in the process of teaching and learning due to the influence of digital pedagogical creativity. The respondents noted that technology has enabled a shift from a teacher-centered approach to a more student-centered one where learning is more active, personalized, and multimodal. From P16's perspective, she stated that teaching dynamics can be managed digitally. *"To me, digital pedagogical creativity is discovering new digital platforms, staying open-minded to the possibilities, and committing to learning about these different resources. Using a variety of digital platforms with digital innovation in the*

classroom will help keep students focused. Having many options can help cater to the specific activity needs."

Participants have suggested several strategies that have been effective in learning outcomes:

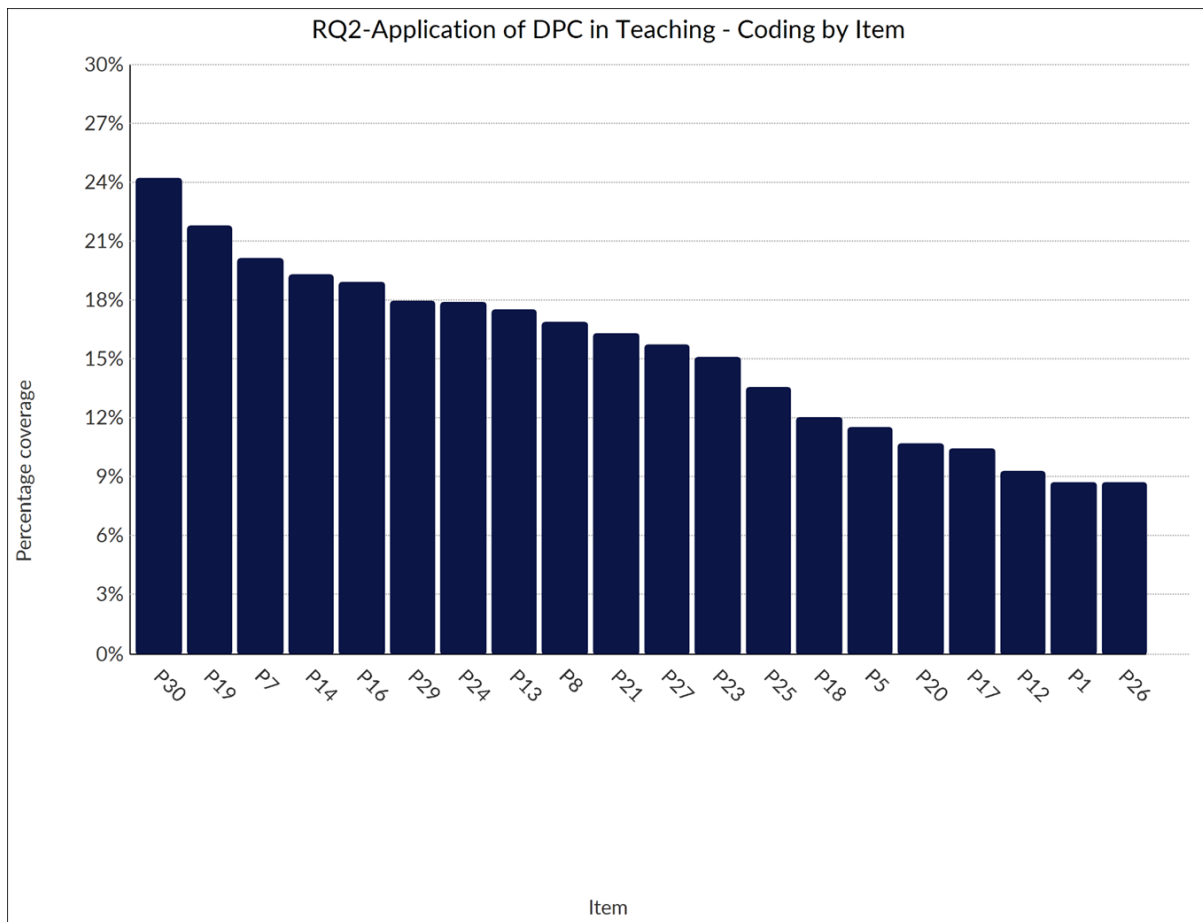
Gamification & Interactive Learning: P-14 shared, *"If a topic on dissection lacks an actual specimen or to further enhance or reinforce an understanding of basic human physiology, I utilize MozaikWeb for a more in-depth and visually stimulating approach."*

Collaborative & Project-Based Learning: P-15 stressed the following: *"I've incorporated interactive whiteboards for collaborative brainstorming and visual notetaking."*

Visual Storytelling and Learning: P-13 declared the following: *"I usually try to prepare for every class I conduct, and I use different applications. Sometimes, if I teach language, I can use some AI platforms that can easily create lesson plans for me. Or I can use Twinkl.com, which actually can create wonderful lesson plans along with some videos."*

This finding is highly significant for researchers and low-income groups, as pedagogical creative technological methods can fill gaps in learning for students with diverse learning, disability and language barriers. Digital storytelling tools can assist in language learning of non-native speakers, and gamification can aid students who have difficulty with conventional teaching strategies.

Figure 5. Theme 2 - Coding by Item



Theme 3: Challenges and Effective Digital Pedagogical Creativity Strategies

Related to RQ3, this theme analyzes the sociocultural as well as the institutional barriers that affect the engagement of teacher candidates with digital pedagogical creativity. Most of the participants showcased a positive attitude towards the use of digital tools. However, their stories often emphasized profound obstacles such as underfunded and over-constrained infrastructure, conservative teaching styles, and inadequate support from higher management. These challenges are also highlighted in literature, especially in digital education in developing regions (Selwyn, 2016). Both pre-service and in-service teachers pointed to the need for context-specific training, sustained mentoring, and opportunities for practice reflection as fundamental.

As an illustration, one participant (P8) reported, *“In our country, the most common problem is the lack of digital tools at the schools. Therefore, most of the students are not familiar with using them. I also have difficulty implementing them into my lesson.”* Another educator (P7) mentioned the lack of professional training, saying, *“I would like to see more and more devices in the classroom so that every student would take part in some digital activity. Training sessions regarding simple and practical tools would be helpful, too. It would be nice if there were space for teachers to share ideas and learn from each other”*. Such statements align with Ranjan & Rana (2023), Rasulova & Nizomova (2024), who state that technology adoption is much more difficult due to inadequate teacher training and support from the institution.

As noted by P-22, *“To reach better student engagement and learning outcomes, we should use digital pedagogical creativity in the best way. Accomplishing it demands us to take some steps. First, we should prepare the materials before the lesson and apply them at the exact time. Then, we should implement the questionnaire method, and while answering the questions, using digital tools can improve the student's interaction.”* In the same spirit, P-20 offered, *“The most difficult for me for a long time was where I was teaching a lack of technological resources and in particular connectivity. Many students could be deemed underprivileged and lacked the resources at home to complete digital tasks.”* These, along with the rest of the Selwyn (2016) studies on divides within digital age education, make an important point that unequal access to technology may cause existing inequalities to worsen.

Common institutional barriers include insufficient training for teachers and lack of administrative buy-in. P-17 stated, *«It is incredibly challenging because many digital platforms require an email to log in and begin using them. When implementing digital pedagogical creativity in the classroom, I encountered a few challenges, such as software bugs or internet connectivity issues that prevented classes from learning”*. P-29 noted, *“The main difficulties*

are related to access to technology. For example, some students do not have computers or stable Internet. In addition, sometimes there are technical failures that interfere with the conduct of classes."

To mitigate these challenges, several participants suggested a more organized approach to professional development, higher institutional spending on technological infrastructure, and providing a blended learning approach for those who do not have sufficient access to technology. Such recommendations are consistent with Ertmer and Glazewski's (2012) research, which suggests that target policy changes and administrative support are necessary to dissolve barriers to using technology.

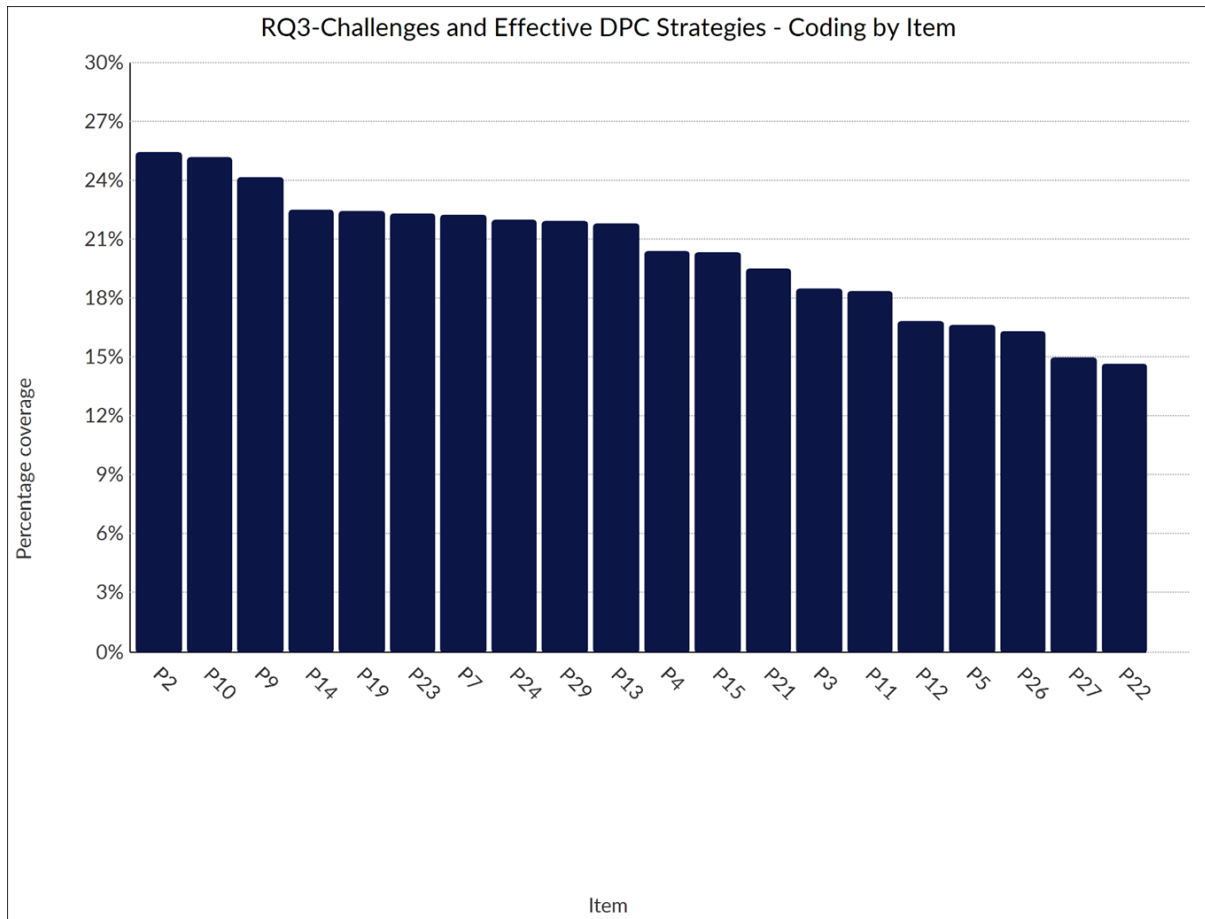
To resolve these barriers, participants proposed multiple strategies, for example: Creating a curriculum for mobile literacy training for students and teachers. P-18 noted, *"Every student should have their own tablet and be taught IT literacy elements from primary school. Homework should be submitted in projects, mind maps, flow charts, digital storytelling, and similar platforms and collected in e-portfolios"*. P-5 stated, *"It will be good if somebody create teacher training for technologies, this kind of training will help teachers develop their knowledges and they keep studying for their students."*

Permitting students to bring mobile phones to school in cases where devices provide insufficient technology. P-18 said, *"If schools cannot support digital devices, bringing mobile phones to school is permissible to ease the ban and allow students to use them in class."*

Providing blended learning models to students with inadequate internet services. Again P-18 noted, *"In my case, the main problems were the lack of tech literacy, the lack of digital technology devices, the instability of the internet connection, the school's policy on mobile devices, and the lack of time. To transition the educational process to digital pedagogy, schools must be equipped accordingly, and multimedia literacy must be well formed among teachers and students."*

These findings significantly impact the success of transformative pedagogies, as they prescribe the necessity of policy frameworks and institutional willingness to provide innovative technological solutions to teaching and learning regardless of their socioeconomic standing.

Figure 6. Theme 3 - Coding by Item



The Role of the MA EDIN Program in Digital Pedagogical Creativity

This theme did not relate to specific research questions but rather captured a cross-cutting influence on all facets of digital pedagogical creativity. Participants pointed out, without exceptions, that the MA EDIN program’s curriculum philosophy and teaching greatly facilitated their creative processes through technology. Emphasis on collaborative learning, design thinking, critical reflection, and transformative pedagogy changed the very core of their learning experiences. Several educators reported that the program fosters their skills by providing exposure to various new digital tools, which improved their levels of teaching and

learning captured through performative indicators. Their explanation is consistent with the larger conversation about the impact of professional development on teachers' digital literacy (Darling-Hammond et al., 2007).

One of the participants (P12) said, *"The MA EDIN program has influenced my digital literacy because I learned how to use a learning management system, Canvas. I learned how to upload tasks, search for assignments and lectures, and connect with professors and classmates."* The other participant (P10) further noted the impact of DST: *"I was taught digital storytelling in Design Thinking in MA EDIN, and I use it in history classes, which makes the learning process more engaging."* Such comments reinforce the conclusions made by Greenhow et. al (2009) that digitally competent educator training is necessary to enable teachers to utilize devices in a more complex and meaningful way.

Moreover, the MA EDIN program has served to close the divide between theory and practice. Access to different digital tools and methods has enabled teachers to innovate in teaching by emphasizing creativity as an essential component of pedagogy. This corroborates other works that support teacher education programs that cultivate digital pedagogical creativity (Bates, 2016).

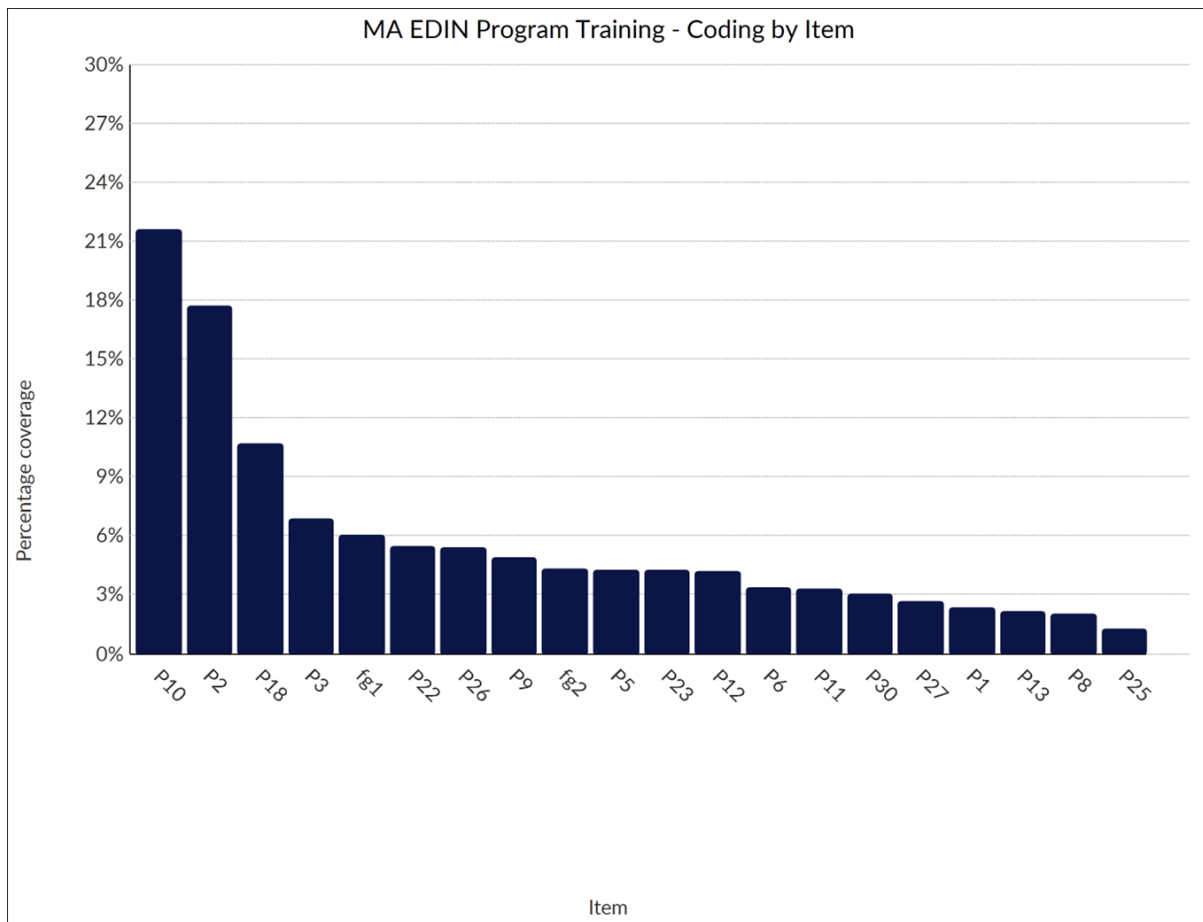
The function of the MA EDIN Program is to foster creativity in the digital pedagogical sphere. Many respondents viewed the MA EDIN program as helpful in improving their digital pedagogical competencies, particularly technology integration. Respondents who received formal educational training reported higher levels of self-confidence, creativity, and efficiency in employing digital devices. P-3 stated, *"At Webster University, by no means, I gained all necessary skills related to digital creativity. In Design Thinking course we were given many tasks using digital tool so far such as PowToon, Animaker, Canva, Storyboarding and Integrated studies course as well is helping me with my e-Platform using OneNote, Notebook LM and so on which would be proof for my further career."* P-27 *"...after starting this Design*

Thinking course, my knowledge about new technological tools has expanded a lot.” P-26 stated, “I learned to use technology effectively in my class when I started my journey at Webster University. Creative Multimedia and Creativity and Innovation classes introduced me to apps and websites like Miro, and AI-suggested methods for lesson planning”. P-2 noted, “This Design Thinking class exercise Storyboard activity was going well. That’s really amazing because, through Miro, we could express ourselves as a team. Doing a video with the help of Animaker for the project I showed creativity and presented what I wanted to visualize.” P-18 declared, “I learned the most about working with platforms in the MA EDIN program’s Creative Multimedia Design for Innovative Learning and Design thinking courses. “

The findings are in line with professional training and its impact on digital literacy and pedagogical innovation (Darling-Hammond et al., 2007). Research has indicated that teachers with formal training in pedagogy and who are also advanced users of computers achieve higher levels of teaching effectiveness (Koehler & Mishra, 2009).

The MA EDIN program's relevance is striking to novice teachers or teachers in low-resource contexts as it builds their ability and self-efficacy towards applying digital pedagogical creativity. This is important for the purposes of wider education reform and professional development programs because it makes adding digital pedagogy components into teacher training curricula worthwhile as policies.

Figure 7. MA EDIN Program Training - Coding by Item



The thematic analysis reveals interviews on digital pedagogical creativity, which reveal an emerging perspective of educational phenomena. Teachers appreciate the ability to use digital devices to enhance creativity, participation, and higher-order thinking skills, but there are still issues such as insufficient technology, inadequate support, and lack of training. The results highlight the importance of investing in teacher workforce development and policy changes to address the problem of technological creativity for educators.

Figure 8. Storyboard on MA EDIN students' demand in schools



In addition, the findings suggest that the MA EDIN program is also an important contributor towards the achievement of digital literacy by teachers, which strengthens the need for high-quality training to advance digital pedagogical creativity. These results add to the broader discussion of enhanced pedagogical approaches through technology and provide actionable advice to governments and educational institutions seeking to foster creativity in the context of digital learning.

Thematic Analysis of Focus Groups

The focus group discussions yielded valuable insights into participants' comprehension, application and challenges around digital pedagogical creativity (DPC). These insights are set out in the same three themes that were identified in the interviews. This thematic analysis was done while interviews were analyzed to enhance the triangulation of data and address the new issues raised in the group discussions.

Theme 1: Understanding of Digital Pedagogical Creativity

A range of respondents from the three groups regarded the concept of digital pedagogical creativity as the proper use of instruments to promote learning and creativity simultaneously. Some quotations reveal that DPC is not only about integrating technology in the classroom but also about creating a situation where the student becomes a creator, collaborator, and critical thinker with the available digital tools. For instance, a participant from

Focus Group 1, P-18 noted technological advancements. *advancements. “As the technology is developing day by day, this is the 21st century, and you can’t expect students to be engaged if you just follow traditional teaching. We need to use advanced technology to capture their interest. Using creative teaching methods—like smart boards, virtual guest speakers, and webinars—keeps students engaged and makes learning more interactive.* Similarly, P-20 from Focus Group 3 stated that digital creativity fosters higher-order thinking skills, including creativity. *“I was reading something last night about the Gallup Review they had done one on the use of technology in the classroom. I think it was about 2019, and they noticed that creativity, problem-solving thinking skills markedly increased when used with technology in the classroom. There was a definite correlation between the skills needed for design and critical thinking, etc.”* Likewise, participants in Focus Group 2, P-32 considered DPC as a means of improving overall students’ soft skills. *“I use a lot of online platforms to create activities during lessons. This helps students become adept at using various digital tools, which is a vital skill in today’s world. These skills open doors to numerous opportunities beyond the classroom.”*

Nevertheless, focus groups showed gaps in their understanding of the concept. More experienced educators in Focus Group 3 seemed particularly concerned about the balance between creativity and learning control. They wondered whether too many available digital instruments might overshadow important pedagogical goals. One respondent observed: *“While digital tools offer creativity, there’s also the challenge of ensuring that they remain pedagogically sound and don’t replace fundamental teaching strategies.”*

This corroborates other studies that suggest, as Mishra & Koehler (2006) pointed out, that for effective digital pedagogy, one must be technologically proficient but also have good instructional design and creativity.

Theme 2: Application of Digital Pedagogical Creativity in Teaching

The second theme investigated how participants adopted DPC methodologies in their teaching practice. All focus groups provided accounts of at least one form of technology-enhanced teaching they practiced, such as:

Gamification and Interactive Learning: Most participants mentioned employing Kahoot, Quizizz, and Worldwall to make their lessons more game-like. For example, one Focus Group 3 participant, P-19, mentioned, *“I always use different types of tools to make my lessons more engaging and more interactive as much as possible, and one of them is gamification, I think, for especially I use it for language learning, for example there are so many types of online games like Kahoot and also bamboozle”*. Another participant from Focus Group 1, P-5 mentioned, *“we can create virtual collaboration like, I mean, Kahoot. For example, we can divide students into 2 groups. And we say, let's try a game with the group and it can help them share their ideas openly, listen to each other, and work together.”*

Digital Storytelling and Visual Learning: Some participants, mainly Focus Group 2, spoke about the use of Canva, Miro, and other digital storytelling tools for visually showcasing student work. One participant, P-5 from Focus Group 1, noted, *“...my attention grasp with one platform storyboard telling right? And I really like that platform, because, except for educational purposes, we can use them ourselves, for example, those who learn as teachers. They can write some scenarios, or they can explain some rules with help of that platform, and I hope I believe that students, both pupils, school pupils, will be engaged because it was so interesting.”* Another participant from Focus Group 2, P-25, noted, *“ There are quite a few tools that we have been introduced to during the course of design thinking, the most prominent one is Canva, that being introduced to making the app, storyboards or making wireframes, was very useful and interesting and engaging, because I, personally have never come across with a program like that, and I believe that in the future it is also a very helpful tool to unleash the*

creativity that we have, and you know, to realize our ideas,” which supports previous work that narrative-based pedagogy led to improved English language skills (Yang et al., 2022).

Collaborative Learning through Technology: Use of Google Classroom, Padlet and Miro was noted for collaboration and peer feedback. One participant from Focus Group 3, P-16, noted, *“Miro Board. I find this a really effective way where it's somewhat comfortable, everyone can do their own thing. And then everyone can share ideas, and it's all in one place. and you can make it organized to how it is. And I think it's a really good method to use technology to kind of have collaboration. and you could also see how people contributed to the discussion.”*

Another participant from Focus Group 2, P-28 stated, *“...before I got used to use Powerpoint, Microsoft Powerpoint. But in MA EDIN, I started to use Canva, and it was a very good tool for my projects. For example, I made presentations and posters quickly, because Canva has so many ready-made templates, and it's very easy to add pictures, icons, and text to make my idea clear and look professional. And it's also very helpful for group work. I shared my designs with my group mates, and we could add them together online. So, it really helped me a lot and save the time and to create creatively.”*

Despite positives, a key difference between groups was noted:

Focus Group 1: Younger and less experienced teachers stated that using these tools was something they were exploring freely. P-7 (Focus Group 1) remarked, *“If I count the agile communication tools which we use in our design thinking course. I can say Canvas, Miro and Zoom are the most used ones. As for me, I mostly use Canva for kind of for design. It's not for kind of for students, kind of for design. There you can find nearly all types of designing projects, designing products like we prepared framework in Canvas I use. I mostly use making pivot versions, or even for recording as well.”*

Focus Group 3: Mostly older and more experienced teachers stated that using digital tools was something they held back from, as P-20 (Focus Group 3) noted, *“Not everybody's connected.*

So those children from middle to lower income housing that didn't have access to Internet found it difficult to use.”

These observations deepen our understanding of the importance of professional development programs that educate teachers on how to appropriately use digital tools (Ertmer & Glazewski, 2012).

Theme 3: Challenges and Effective Strategies for Digital Pedagogical Creativity

After discussing some benefits of digital pedagogy, participants pointed out several issues that were preventing effective implementation. These challenges can be categorized into four key areas:

1. Limited Access to Technology and Digital Tools

Regarding participants of Focus Group 3, there was an apparent concern regarding unequal access to digital tools as well as reliable internet connectivity. One of the participants, P-17, noted, *“However, they may face the barrier in Internet connection or whatever. But I think is in majority group of people are able to access, especially people who, under privilege. Sometimes they'll not be able to go for the pop, a normal school, but by digital learning they can be able an opportunity for them to access into the proper education system.”* This is in accordance with a study that states the digital divide is one of the many impediments to equitable education (Warschauer & Matuchniak, 2010).

2. Lack of Institutional Support and Professional Development

Participants from Focus Group 2 expressed frustration over the absence of any such prerequisite formal training and expressed that the pedagogy of technology integration is often learned on one's own. One educator, P-19, shared her views in the following way: *“I think we need some dedicated hours for it for learning this application. And I think we need also the other mentor, for example, explaining the programs how to do it, how to do to use it also.”*

P-25 noted, *“This contemporary world is about technology and innovation. and the younger generation, the students that we work with are born into this world, and they are far better than most adults are nowadays, and I believe that integrating technology and innovation into education is crucial.”* They provide further reasoning for the concerns above in the absence of institutional support, as stress for effective digital pedagogical creativity has been found in further literature (Voogt et al., 2012).

3. Balancing Digital Pedagogical Creativity with Traditional Methods

A challenge that emerged from all three focus groups was the integration of digital creativity with traditional teaching styles. While most participants appreciated the use of interactivity and the Internet in lessons, some teachers in Focus Group 3 expressed concern about excessive dependence on technology at the cost of primary teaching skills. One of the participants, P-13, described this challenge in the following way: *“They are seeing it on the smart board. Kids need a little inspiration. I think technology could be both like helpful, and it might also take away their creativity.”* The information above supports the argument for adopting hybrid learning, which they have experienced in the MA EDIN program, where teachers can harness the creativity of digital pedagogical tools while still using traditional teaching methods.

The focus groups’ thematic analysis demonstrates that even though digital pedagogical creativity is viewed as a significant component of contemporary education, its practicality is dependent on the educator’s experience, institutional support, and resource availability. Teachers who are younger and less experienced (Focus Group 1) tend to integrate these tools into lessons without constraints, while more experienced educators (Focus Group 3) are more reserved in their implementation but do tend to consider the appropriateness of the use of such tools and approaches in achieving teaching and learning objectives. All groups noted the challenges posed by restricted availability, insufficient training and difficulty in integrating

modern teaching tools alongside traditional approaches. These results correlate with the literature, which indicates that successful integration of digital pedagogical creativity requires more than just access to technology, demanding institutional support, professional development, and appropriate pedagogical strategy (Mishra & Koehler, 2006; Ertmer & Glazewski, 2012).

To further illustrate the connection of themes and codes from focus group discussions, three figures were generated from NVivo to visualize the relationship between these concepts.

Figure 9. The Interconnectedness of Themes between F3 and F1

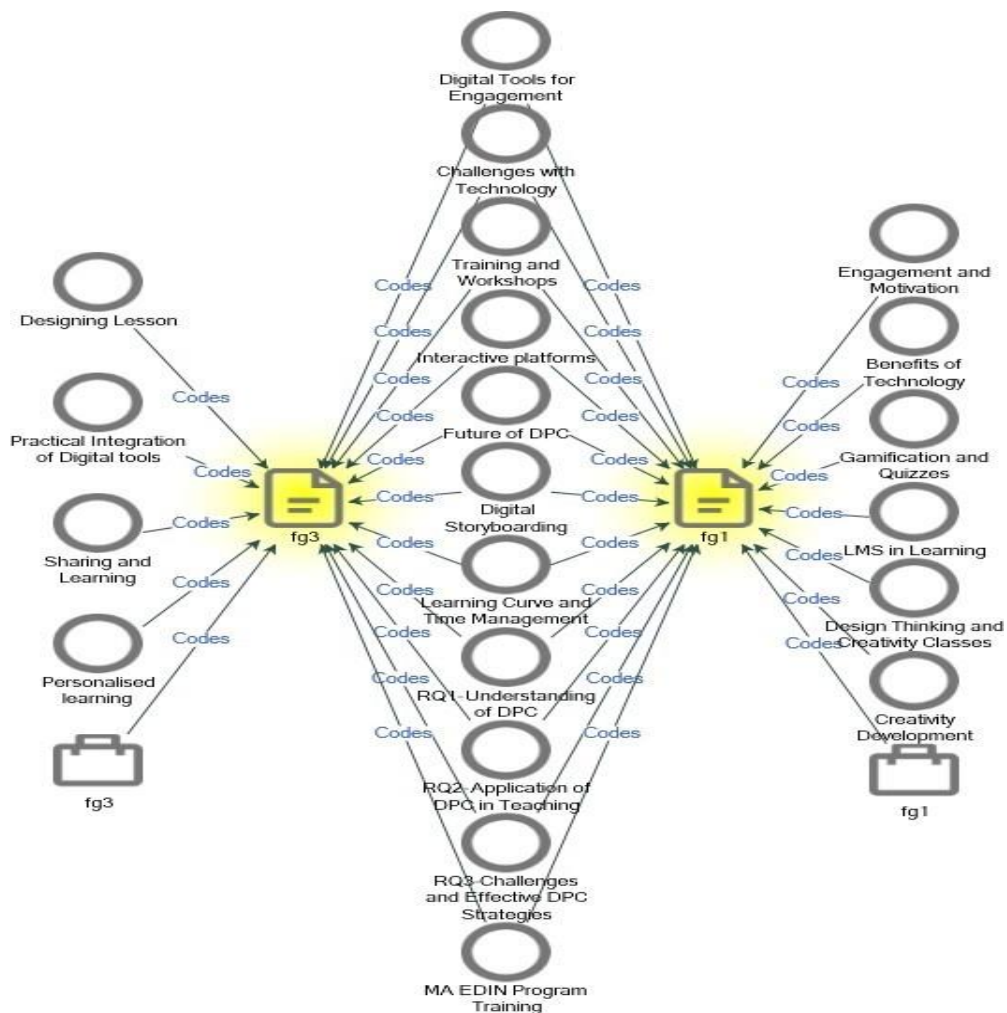


Figure 9 illustrates the shared concepts obtained from coding the discussions of focus group 3 and focus group 1 on Digital Pedagogical Creativity (DPC). At the more centrally located part, the research questions, which are RQ1: Understanding of DPC, RQ2: Application

of DPC in Teaching, RQ3: Challenges and Effective DPC Strategies, and MA EDIN program training, provide a backbone of what needs to be understood by the participants. Digital tools for engagement, challenges with technology, training and workshops, interactive platforms, the future of DPC, digital storyboarding, learning curves and time management are some of the common themes that demonstrate creative digital approaches of the participants. This holistic structure illustrates how both groups have the same issues and creative solutions when using digital technologies for educational purposes. While motivation and engagement, benefits of technology, gamification and quizzes, LMS in learning, and design thinking, as well as creativity nurturing, denote the role of the active learning process in Focus Group 1, designing lessons, practical integration of digital tools, sharing and learning, and personalized learning were discussed more in Focus Group 3.

Figure 10. Interconnectedness of Themes between F3 and F2

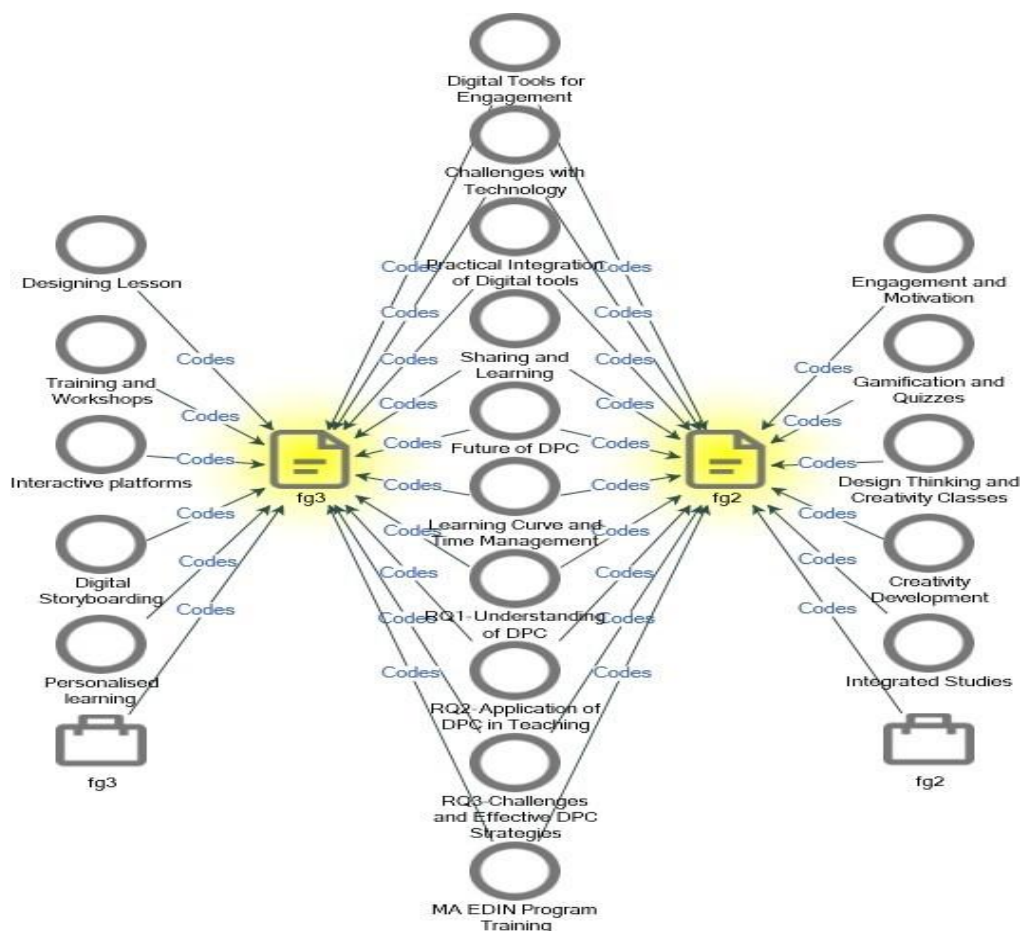


Figure 10 represents the common themes that emerged from the coding of discussions from FG3 and FG2 with respect to Digital Pedagogical Creativity (DPC) correlated to the MA EDIN program. Like in the previous figure, the central framework revolves around the three research questions.

Key recurring codes in both groups were digital tools for engagement, challenges with technology, practical integration of digital tools, sharing and learning, and the future of DPC. Focus group 2 put more emphasis on engagement and motivation, gamification and quizzes, and MA EDIN program's courses, while Focus group 3 discussed designing lessons. Training and workshops, interactive platforms, digital storyboarding and personalized learning.

Figure 11. Interconnectedness of Themes between F2 and F1

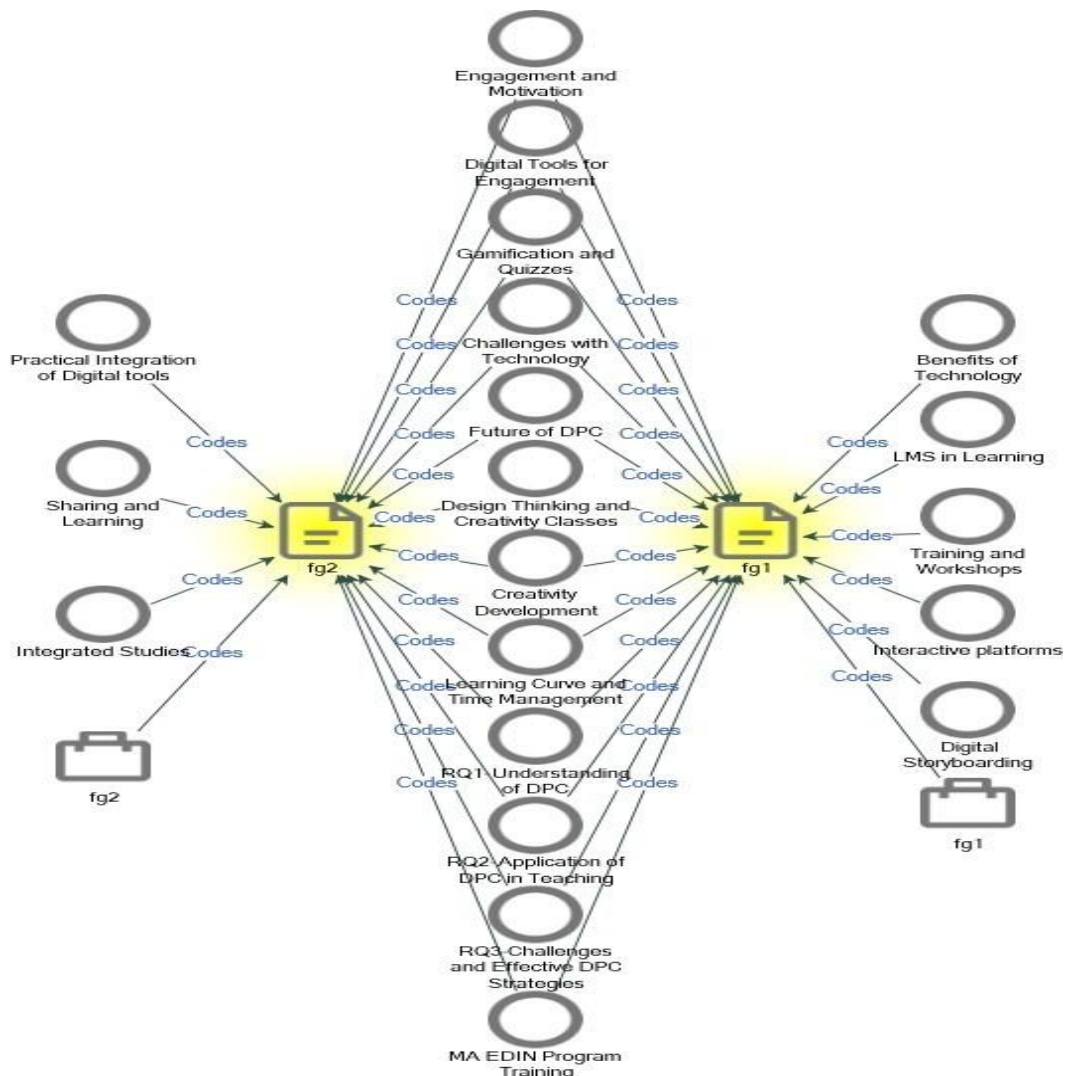


Figure 11 depicts the interconnected codes that came from the coding of discussions from FG2 and FG1 under the central framework revolving around the same three research questions. Unlike the previous two groups' common topics, there were more identical codes in these groups that were engagement and motivation, digital tools for engagement, gamification and quizzes, challenges with technology, future of DPC, MA EDIN program's courses, and learning curve and time management. Focus group 2 discussed more about practical integration of digital tools, sharing and learning, and integrated studies, while focus group 1 talked more about benefits of technology, LMS in learning, training and workshops, interactive platforms and digital storyboarding.

The findings of this study, while Uzbekistan engages in the project "Digital Uzbekistan 2030," show the need for structured training programs, institutional support, and policies targeting digital equity. These suggest not only enhancing digital pedagogical creativity but also allowing all teachers, regardless of their level of skill, to integrate technology into their instruction.

Thematic Analysis of Digital Artifacts

Along with the interviews and focus group discussions, 55 digital artifacts created by the participants of the MA EDIN program were collected and analyzed. These were visual and interactive materials such as:

- ❖ Storyboards created with Pixton and StoryboardThat
- ❖ Digital storytelling videos created with Powtoon, Tweencraft and Animaker
- ❖ Wireframes of digital applications they conceptualized regarding specific services in education or other domains
- ❖ Miroboards and Canva presentations, along with mind and concept maps that were done during the Design Thinking and Integrated Studies coursework.

Analyzing these artifacts helped understand in detail how digital pedagogical creativity (DPC) is performed in practice. These artifacts were analyzed based on a rubric designed around four intersecting frameworks:

- ❖ Amabile’s Componential Model of Creativity, evaluating originality, task motivation, and domain relevant skills underpinning the creativity expressed in the artifact design,
- ❖ The TPACK Framework analyzes the technological, pedagogical, and content knowledge integration and balancing of each component.
- ❖ Rodney’s Creativity Model (2024) assesses reflection and design thinking, interdisciplinary connections, and creative and critical thinking.
- ❖ Student engagement and creative expression are grounded on personal reflections that are included in digital portfolios and submission documents.

Key Findings from Artifact Analysis

The analysis indicated the following themes and subthemes:

1. Creativity Through Narrative and Visual Storytelling

The overwhelming majority, approximately 60%, and especially those created on Pixton, StoryboardThat, and Animaker, showed outstanding originality in narrative construction and design. Students framed their lessons or project ideas around imaginative characters, archetypical classroom settings, or global citizenry themes. For instance, one storyboard was a comic strip of a refugee child’s experience in a multilingual school, capturing the story with empathy and bilingual labels, reflecting inclusive teaching practices. This connects with Rodney’s ideas on empathy and global understanding as principles of foundational learning in creative education.

2. Integrated Use of Technology and Pedagogy (TPACK in Action)

More than 80% of the artifacts demonstrated effective interlacing of content, pedagogy, and technology. In Canva projects and Miro boards, learners created unit plans, concept maps,

or peer teaching activities that were interactive, enhancing engagement with the content. A poster lesson on environmental sustainability in Canva featured quizzes and interactive components, including QR codes, flipped video links, and a virtual gallery walk. These are clear applications of the TPACK model and Rodney's design thinking cycle in practice.

3. Inclusion, Equity, and Differentiation

Several digital storytelling projects featured culturally diverse characters, disabled learners, or trauma-informed lenses. These represent emerging understanding of inclusion and relate to Amabile's domain-relevant skills framework as well as Rodney's approach to policy and value-based creativity. In one Powtoon video, the creator crafted a captivating narrative teaching science to visually impaired learners, employing audio descriptions and colorful background music. This holistic approach demonstrates creativity motivated by empathy-driven context.

4. Engagement and Motivation by Interactive Media

The participants considered student engagement and motivation as key drivers, as demonstrated by gamified Kahoot templates, branching scenarios in Miro, and comic-based quizzes. Participants shared how digital tools fostered playful learning and increased autonomy, which demonstrates intrinsic task motivation (Amabile, 1996) and flow experiences (Csikszentmihalyi, 1999).

5. Reflective Practice and Ongoing Cycles

About 70 percent of the digital portfolios and concept maps examined contained reflection boxes or self-assessment rubrics. Students articulated what succeeded, what they could refine, and how the task influenced their thinking as teachers. This accounts for Rodney's emphasis on reflection and iterative design as critical components of fostering creativity.

Table 4. Coding for digital artifacts

Theme	Coding References
Creativity & Originality	89
Pedagogical Intent	74
Technological Integration (TPACK)	71
Learner Engagement	65
Inclusivity & Diversity	42
Reflective Practice	37

Table 4 shows the coding of the artifacts thematically to identify this frequency across 55 artifacts that depicted stronger patterns of creativity and engagement and, in some cases, deeper reflection alongside inclusive pedagogy needed more attention for professional development.

This artifact analysis illustrates that digital creativity goes beyond the interaction with tools to integrating technology within the educational system. It also stresses the need for continued mentoring, contextual instruction, and evaluation patterns that incorporate visual, multimodal, and student-created design elements. These results further support the overarching insights from the interview and focus group data— that the MA EDIN program encourages advanced levels of creative pedagogical thought with the presence of organizational support, metacognitive reflection, and sheltered instruction.

8. Discussion

In this section, the discussions are analyzed using what the study's theories and previous literature suggest while drawing implications for further research, policy, and marginalized groups. The limitations and suggestions for further study were also acknowledged for further study.

8.1. Interpretation of Findings

This study's findings shed light on how pre-service and in-service teachers in Uzbekistan understand and practice digital pedagogical creativity (DPC). They expose different institutional, generational, and contextual influences toward the development of creative digital pedagogy. These finds are considered along the TPACK framework (Mishra & Koehler, 2006) and creativity frameworks (Amabile, 1983; Csikszentmihalyi, 1999), so it is clear how pedagogy, technology, and creativity coexist in a non-Western setting.

Digital Pedagogical Creativity: Beyond Technology Integration

The results from this study also aligned with Mishra and Koehler's (2006) TPACK model, which incorporates the integration of pedagogical, technological, and content knowledge. The participants in this study showed that they understood DPC requires more than simply using technology; rather, it requires the thoughtful integration of pedagogy that fosters engagement and higher-order thinking.

One participant remarked, "The use of digital resources is not only about providing alternatives to textbooks. It is about enabling students to reason and to collaborate in a creative manner" (P-9). That agrees with Harris and Hofer (2009), who argue, based on empirical evidence, that effective technology use in instruction enhances the interest of learners to not only participate but also to achieve. This study contributes to the understanding of the literature

on post-Soviet countries by demonstrating the impact of culture and institutions on such integration.

Generational Differences and the Role of Professional Development

A notable finding was the age difference in the use of digital resources. Younger teachers, who most likely belong to the digital generation, were more willing to try gamification, digital storytelling, and other collaborative activities. This corresponds with research that suggests the so-called ‘digital natives’ have a lower adoption barrier (Prensky, 2001). On the other hand, older teachers were more skeptical of students’ dependence on technology because they overtly associated the use of modern technologies with the deterioration of teaching values. This adds credibility to Selwyn’s (2016) claim that older teachers tend to find the intersection of pedagogy and innovation challenging. Notwithstanding, this study shows that professional development courses significantly reduce this gap. The MA EDIN participants who received regular professional development appeared to have more positive attitudes toward using digital imagination and creativity, which supports Voogt et al. (2012) and their claims on the necessity of professional training.

Impact of Institutional Support on Digital Creativity

It became clear that institutional support had the most impact on how teachers engaged with DPC. This correlates with what Ertmer and Glazewski (2012) established when they argued that first-order barriers such as policies and infrastructure are, in many cases, harder to deal with than the attitude of the individual teacher.

While participants from well-supported institutions stated that they were more willing to try new things with digital tools, in under-resourced schools, the lack of technological creativity led to a lack of creativity. These findings support the work of Warschauer and Matuchniak

(2010), who discuss the impact of the digital divide on students' and teachers' opportunities. This study has found that the efforts put in place by the government under the Digital Uzbekistan 2030 program do little, if anything, to improve the situation in the rural regions where the likelihood of being connected to the internet is very low.

“In my rural school, we have only one computer lab. It's difficult to use technology effectively when there are so few resources available.” (Focus Group 2)

“My comfort with these tools was very minimal when I began using them; with time, their incorporation into my lessons became manageable with the help of the training sessions.” (P-12)

Creativity Models and Motivation in Digital Pedagogy

The results also validate Amabile's Componential Theory of Creativity (1983), which states that task motivation, domain-specific skills, and creativity processes are primary determinants of performance. Teachers showing intrinsic motivation were more likely to engage in creative applications of technology. Those participants who were not confident or found the tools too sophisticated were not motivated to use them in a creative way. This aligns with Deci and Ryan's (1985) Self-Determination Theory that appreciates the contribution of autonomy and competence as motivators for educators. There was greater engagement in creative digital practices among teachers who perceived institutional support to be present. (P-7) noted, *“When I feel I can try different things without being evaluated, I am more willing to take risks regarding technology.”* Also, when considering Csikszentmihalyi's (1996) Systems Model of Creativity, which associates creativity with the integration of an individual, the domain, and the environment, it was clear that students from urban schools with better infrastructure had a greater sense of creativity than students from rural schools.

Balancing Pedagogy and Technology

Many discussions centered on the balance that needs to be maintained between the traditional values of pedagogy and the application of digital tools. While some participants argued that modern technology was an opportunity for new creative expressions, others were not as optimistic and felt it could inhibit the fundamentals of teaching. While the advantages of DPC are undisputed, some experts warn that having too strong of a focus on digitalization can cause one to lose pedagogical substance (Selwyn, 2016; Ertmer & Glazewski, 2012). This was also echoed by a few participants who stressed the need for more rooted teaching strategies than modern resources.

One participant from Focus Group 3 said, “*Teachers should not forget the basics — technology should only assist in the process of teaching.*” This also adds to the work of Koehler and Mishra (2009), who claim that integration of technology should serve a purpose because otherwise it can be detrimental. It adds to the literature on how cultural factors in Uzbekistan creates a broader understanding of the attitudes towards teacher-centered instruction to the extent that it makes it harder to adopt student-centered digital creativity.

Overall, the findings align with already existing assumptions and offer new explanations relevant to the post-Soviet education system. The TPACK framework, Amabile’s theory, and Theory, and Csikszentmihalyi’s model are still valid, but this study shows that these teacher candidates from Uzbekistan are placed within the context of digital pedagogical creativity and suffer from a lack of institutional assistance, low levels of digital literacy, and negative cultural perceptions.

8.2. Connection to Theoretical Framework

This study's findings both incorporate and develop contemporary theories. The participants' collective perspective on creativity supports sociocultural frameworks (Glăveanu, 2008) and further develops Amabile's (1983) Componential Theory by emphasizing collective motivation, not individual. The impact of organizational culture further supports Csikszentmihalyi's (1996) Systems Model, drawing attention to "gatekeepers" like curriculum developers, educational administrators, and policy documents that facilitate or constrain creativity within teacher education. The above methodologies served as a synthesizing conceptual framework for studying digital pedagogical creativity (DPC) and, as it was described, the impact of integrating technology, pedagogy, content, and creativity in the educational practices of teacher candidates from Uzbekistan was examined.

TPACK Framework and Its Relevance to DPC

In the TPACK framework, everything revolves around the interaction between technology, pedagogy, and content knowledge as the three important aspects of teaching (Mishra & Koehler, 2006). The results of this study confirm this framework by proving that teacher candidates incorporating DPC were able to:

- ❖ Have an established level of proficiency in technological devices and tools, such as Canva, Miro, and Quizizz.
- ❖ Have an established level of pedagogical knowledge to design activities that foster collaboration, critical thinking, and creativity among students.
- ❖ Have sufficient knowledge of the subject matter to recontextualize the technology for language pedagogy, design thinking, and innovative education.

To illustrate, one respondent described how the TPACK intersection allowed these learners to learn in more profound ways: *“In the Design Thinking course, we utilized Canva to create visual storyboards for real-world issues.” (P-14)*

Nevertheless, the results suggest that gaps within the different TPACK components obstructed DPC deployment. Teachers frequently mentioned insufficient access to basic instructional computer training as an impediment to instruction, supporting Harris and Hofer’s (2009) conclusion that when teachers feel unprepared, they emphasize pedagogy rather than technology.

The TPACK framework addresses the relationship between technology and pedagogy and content integration but has been criticized for its lack of tangibility and presumed equal resource distribution (Tregubova, 2021). From this study, there was a consensus that the combination of infrastructural deficits and rigid curricula impeded holistic TPACK application. This indicates that while TPACK is conceptually multifaceted, it needs to be more flexible to systemic and institutional constraints, like those in Uzbekistan.

Amabile’s Creativity Theory

Amabile's Componential Theory of Creativity (1983) states that motivation for a task, mastery of the relevant domain, and relevant creativity processes are important determinants of creativity. This framework was echoed in the experiences of teacher trainees who:

- ❖ Expressed greater motivation when they had the freedom to explore digital tools.
- ❖ Acquired professional domain-relevant skills in the MA EDIN program.
- ❖ Participated in creative processes like storytelling and gamification that fostered student-centered learning.

"The more motivated and self-governed I am, the more freely I can teach creatively." This participant's statement represents how motivation and self-governance influence creative teaching integration. Amabile's theory explains that motivation, and in particular intrinsic motivation, is a fundamental enabling component for creativity. Teachers who perceived support and appreciation from their institutions were more skilled in carrying out innovative ideas compared to teachers who perceived strong curricular framework control.

Csikszentmihalyi's model of Creativity

In his work from 1996, Csikszentmihalyi's Systems Model of Creativity explains that creativity stems from the relationship among three components: the individual, the domain, and the field (Csikszentmihalyi, 1996). The results of this research illustrate the integration of

- ❖ personal teacher attributes (age, motivation, and level of digital competence)
- ❖ domain knowledge (pedagogical skills and subject matter knowledge), and
- ❖ field use (institutional backing and public opinion) in adopting and implementing DPC.

For example, participants who worked in supportive institutional contexts indicated higher creativity levels because of the available digital tools and professional development activities. On the other hand, those in resource-poor contexts reported lower levels of creative productivity. "We need support not just with technology but also with how to use it in a creative way. Without that support, it feels like we are just ticking a box." (Focus Group 3). This claim reinforces the idea provided by Voogt et al. (2012) about the effects of institutional culture on teachers' propensity and capacity to practice innovative pedagogy. Furthermore, this research builds on Csikszentmihalyi's model by revealing the degree to which cultural disposition in post-Soviet countries complicates creativity in education.

Both Amabile's and Csikszentmihalyi's models provide perspective on the individual and systems levels of creativity. Amabile's model, however, focuses too much on motivation and domain-specific knowledge, ignoring the constraints caused by highly centralized educational systems. Likewise, Csikszentmihalyi's systems model assumes a culturally free space for negotiation, which is likely not the case in more hierarchical, exam-centric environments. The data presented here suggests that teachers' creative agency is often negotiated within and sometimes constrained by post-Soviet institutional cultures.

Rodney's Creativity Model (2024)

Rodney's Creativity Model meticulously explains the creativity development process as a blend of policy formulation, reflective practice, experiential design, interdisciplinary learning, and creativity evaluation. The model shifts the mindset from fostering 'creativity' in silos to nurturing a 'culture of creativity' in problem-solving, educational leadership, and thinking creativity. This shift offers more insight into the scope of digital pedagogical creativity (DPC) in Uzbekistan, where the role of creative education is overshadowed by institutional barriers and cultural practices.

Application to the Findings

The results from this research are in line with the rationale for Rodney's model's requirements of:

- ❖ Policies retentive for intellectual self-risking of the Robinson type (2011).
- ❖ Experiential learning and project work designed to develop students' attitudes toward creative problem-solving (Guilford, 1967).
- ❖ Processes of innovation through design thinking: “Designing is a process, not an event” (Christensen, 1997).

- ❖ Interdisciplinary education aimed at developing a world view and creative efficacy (Rogers, 2003).

The core of creativity described in Rodney's model captures the need expressed by participants to blend creativity with everyday instructional activities instead of confining it to designated subjects. Participants emphasized the need to utilize technology to boost creativeness in all disciplines, which aligns with Amabile's (1996) observation that creativity should be integrated throughout instruction. One participant (P-14) shared, *“Every lesson, even outside of design courses, is infused with creativity. History and English lessons become more engaging, and therefore easier to teach, when students are actively participating.”* This goes hand in hand with the aim of this study, which seeks to nurture creativity on a continuous basis rather than as a skill worked on in isolation.

Experiential Learning and Project-Based Approaches

Rodney's highlight of experiential learning captures the focus of the study on how project-based tasks motivate students to solve authentic problems. Participants referred to digital storytelling and design thinking projects as the most important for developing students' creativity because students do not just passively receive content; they create and present it. One participant (P-9) stated, *“In design thinking, we tackle real problems. Students have to find ways to solve them and present their ideas in a digital format. Learning is not about rote memorization, but rather, about using your brain.”* This affirms the claim of Webster University (2024) that students who are involved in project work develop better problem-solving and teamwork skills because such activities provide valuable opportunities for imaginative work.

Design Thinking Framework

Rodney's findings confirmed the emphasis given to design thinking as a primary strategy for systematic innovation in the study. Participants explained how the cyclic process of developing, testing, and modifying concepts fostered risk-taking and flexibility in strategies. In the words of one (P-7) participant: *“We had processes in which learners created solutions, applied them, and later changed their ideas. It challenges them to improve constantly.”* This is consistent with Christensen's (1997) claim that design thinking helps in building creative self-efficacy by enabling learners to regard failure as an inherent aspect of the innovative process. Additionally, this blended approach illustrates TPACK aspects by including pedagogy, content, and technology.

Interdisciplinary and Global Dimension

Rodney's model shows the importance of an interdisciplinary as well as a global approach that allows students to integrate concepts from psychology, business, and education. Participants in the MA EDIN program often mentioned the need for an awareness of different cultures and global issues in their work on digital projects. One participant (Focus Group 2) recalled, *“We had to work on digital storytelling, and it was made clear to us that we were not to think locally. We had to think globally, and different cultures had to be factored in when trying to tell the story.”* This illustrates Rogers' (2003) claim that students' creativity can be inhibited by a lack of global perspective. It also resonates with the findings of Webster University (2024) that multicultural and interprofessional attitudes fostered by hybrid campuses, like in Tashkent, are favorable.

Evaluation of Creativity

Rodney's model suggests that creative performance should be evaluated through management of projects, portfolios, and digital artifacts rather than traditional assessment

styles. The participants of this study reinforced this suggestion by stating that students' creative progress needs to be captured and evaluated through other means. One participant (P-5) said, *“We did not take exams. We taught students to use digital portfolios and video presentations. It demonstrated how creatively students could solve problems, rather than how well they could rote memorize information.”* This corroborates Amabile’s (1996) claim that some aspects of creativity cannot be assessed without real-life authentic tasks that involve the process and product of creative thinking. It also supports the position of Csikszentmihalyi (1996), who, unlike many educators, believes that feedback is much more helpful in developing creativity if given immediately after work rather than waiting for summative assessments.

Rodney’s Creativity Model adds to the remaining theoretical frameworks of this research in the following ways:

Finishing TPACK: It includes narrative digital creativity as something people do within a specific organization and culture and explains reluctance of some teachers to use technology even when they possess pedagogical and technological skills.

Amabile’s theory extension illustrates how creativity is lacking not only in motivation and skill in a particular domain but also in the provision of context for creative acts to flourish.

Expanding Csikszentmihalyi’s Model: It discusses creativity in terms of the engagement of individuals, domains, and fields, as well as global and interdisciplinary contexts, because it focuses on global perspectives and alternative assessment.

Rodney's Creativity Model is helpful in explaining how creativity is enhanced through support from policies and the administration, project- and fieldwork-based classes, design thinking pedagogy, teaching and learning in different subjects, and creative forms of evaluation. This model, together with TPACK, Amabile's Componential Theory, and

Csikszentmihalyi's Systems Model, helps explain the development of digital pedagogical creativity in post-Soviet countries. It underscores the need to integrate institutional policy, teacher enthusiasm, and creativity in interdisciplinary teaching for curriculum integration of creativity to be effective. The findings reflect Glăveanu's (2008) argument on the emergence of social creativity, which challenges earlier claims like Guilford's (1967), which saw creativity as a cognitive ability of a person. This argument is necessary when we talk about collaborative digital pedagogies in Uzbekistan.

Though TPACK and Amabile's models applied in this research are helpful, their weaknesses must be stressed. For instance, Tregubova (2021) discovered that some frameworks, even if well intended, do not work in post-Soviet educational systems because of their institutional inflexibility and overpowering teaching culture. This mirrors findings from the present study, where numerous participants reported struggling to use digital creativity even though they recognized its necessity.

These assumptions shift the focus of discussion on teacher training in Uzbekistan's context, thus filling a gap in the literature through bridging TPACK to non-Western countries with limited infrastructure and developed cultures, analyzing the interplay of motivational and environmental factors in creative digital teaching activities, and addressing sociocultural contexts in which there is little institutional and professional development support.

In conclusion, the findings suggest that digital pedagogical creativity can be captured using existing, more established theoretical lenses, but will always remain bound to those unique contextual factors from Uzbekistan. The need to integrate technology creatively goes beyond knowledge and motivation to include institutional and cultural support along with resources. In this way, the study contributes to the debate by showing how, or in what ways, the theoretical models need to be adjusted to the specific context-oriented obstacles.

8.3. Implications for Research Communities and Marginalized Communities

This section analyzes the impact of the study on the research community, policymakers, and marginalized groups, especially regarding the transformation of teacher education in post-Soviet Uzbekistan. The findings portray how cultural, institutional, and technological forces constrain and enable the imagination of digital pedagogical creativity (DPC) enactment, offering relevance to parallels undergoing educational change.

Research Community Implications

This gap in literature contributes to the discussion of digital pedagogy by focusing on the lack of literature for the non-Western world, particularly post-Soviet Uzbekistan and its digital teacher education issues. A body of literature in Western countries has focused on how technologies enable creativity (Mishra & Koehler, 2006; Selwyn, 2016). This study makes several contributions to the body of work in digital pedagogy and digital creativity. More specifically, it brings attention to gaps in dominant narratives accepted without question in the West from a non-Western, post-Soviet angle. Some of the most insightful post-Soviet insights are:

- ❖ **Cultural Sensitivity in Digital Pedagogy:** Creativity is not perceived in the same way everywhere. Uzbekistan's culture is still dominated by a teacher's prevailing culture, which impacts the adoption of the digital paradigm. Rodney's Creativity Model asserts creativity goes beyond having skills and the ability to apply the Internet and requires institutional policies that foster risk-taking (Robinson, 2011).
- ❖ **Maintaining a Fine Line Between Tradition and Change:** Concern regarding over-dependence on technology was noted, suggesting that traditional teaching and learning values are still relevant. These findings argue against global literature that

looks at technology from an overly positive view (Ertmer & Glazewski, 2012), as they showcase that teacher self-esteem, and the surrounding culture matter a lot.

- ❖ Reconceptualizing Creativity Frameworks: Amabile's and Csikszentmihalyi's creative theories approach, DPC adjusts Rodney's Model of TPACK, reflects its complex evolving nature, and expansion is social and motivationally framed, emotional, and skills-based. This conceptual stratification sets forth the analytical tools for the advancing complexity in subsequent research.

Implications for Marginalized Communities

The results of this research highlight the most striking gaps in access to technology and the potential for digital creativity between urban and rural schools and, more broadly, students and teachers in poorly resourced communities. The participants unfailingly emphasized how the gap between urban and rural schools in terms of resources created a deficit in the level of engagement and creativity among students.

There was insufficient access to devices as rural areas had unreliable internet, outdated devices, and insufficient training opportunities. As one participant (Focus Group 2) noted, *"In rural schools, the internet doesn't work a lot of the time. Because of this, we must cancel most of the digital activities. The students get frustrated as they lose the opportunity to explore their creative potential."* Moreover, inequitable opportunities for activities were observed as students from low-income schools did not participate in sufficient project-based activities and digital storytelling, impairing their ability to think critically and solve problems. This supports Warschauer and Matuchniak's (2010) claim that the digital divide widens the education gap. Finally, teachers in underprivileged areas wished for more specialized contextual training, as they complained about not having enough practical modules, mostly receiving lectures. This corresponds with Voogt et al. (2012), who affirm that practical training results in most digital skill integration. Such disparities highlight the need to construct effective and scalable equity-

driven frameworks for teacher education and teacher support systems focused on the most marginalized populations.

Policy Implications

These findings indicate that policy changes should address the equitable distribution of resources. The implementation of Digital Uzbekistan 2030 is focused on improving digital infrastructure. However, the implementation is much slower than planned. If rural schools are given priority for digital investment, then inequalities can be minimized. Along with policies, educators' mindsets and their autonomy also require attention. The policy to encourage creativity is to permit cross-disciplinary teaching (Amabile, 1996), encourage taking intellectual risks (Robinson, 2007), and respect culture. Culturally sensitive professional development programs are needed for teachers to incorporate traditional values into new progressive digital initiatives. Ertmer and Glazewski (2012) pointed out that professional development can be ineffective when deep-rooted beliefs, classroom realities, or contextual limitations are not attended to. The participants in this study equally stressed that cultural and pedagogical shifts must accompany mere technical skill training.

Impact on Global Education Discourse

This research adds to the discourse on digital pedagogy from a non-Western, post-Soviet standpoint. It overlooks the assumption that digital tools foster creativity and demonstrates that success hinges on context, support, and emotional and social readiness. Adapting creativity frameworks more to context alongside cultural norms, institutional support, and equity, rather than skill or toolkit use, is vital. Such an approach is essential for achieving inclusivity in the global frameworks of pedagogical creativity.

8.4. Limitations of the Study

This study, like other qualitative studies, has a limited focus regarding scope and methodology, as well as context. These limitations do not detract from the value of the findings

but rather highlight the need for additional interpretation, framing, and further research. This research studies how pre-service and in-service teachers in Uzbekistan practice and construct digital pedagogical creativity (DPC). However, the results are not likely to be universally accepted. The conclusions may be inadequate for educators in rural or low-resourced areas due to the distinctive nature of the MA EDIN program and the location of the university within an urban setting. These limitations must be acknowledged to interpret the findings and for further investigations to be conducted.

Limited Generalizability

This study was restricted to a single group of participants: teacher candidates studying at a single university located in Tashkent, Uzbekistan. The findings offer rich context-specific information, but these findings will not represent what happens in other institutions or areas in Uzbekistan. There is considerable difference in the educational context, such as that between urban and rural areas, as demonstrated by the digital divide, which remained evident in the responses of the participants. This sample could easily be extended in future studies to include several institutions from different geographical and socioeconomic locations.

Self-Reported Information and Social Bias

The research depended on interviews and focus groups, where the candidates' perceptions and experiences were self-reported. Social desirability effect bias could have impacted responses such that participants may have exaggerated the circumstances under which they used the digital tools or minimized obstacles to appear better. One participant recollected very positively the use of digital storytelling, yet the analysis of digital artifacts indicated little implementation other than superficial-level activities. Classroom observations or student feedback on lessons learned should be part of future studies to triangulate the data and provide a more realistic picture of the application of DPC.

Short-Term View

This study does not attempt to provide a longitudinal view of the participants' experiences but rather a snapshot of them. As much as participants reflected on their experiences, it is unclear to what degree they exhausted DPC after participating in the MA EDIN program. As Ertmer and Glazewski (2012) suggested, further longitudinal research might investigate the development and decline of teachers' engagement with digital tools over time. Creative pedagogy after professional development may be more clearly seen in the participants post-graduation.

Overrepresentation of Urban Teachers Compared to Rural Educators

Urban teachers appeared to comprise most respondents even though both rural and urban teachers were invited to participate in the study. Urban respondents are more optimistic about the implementation of DPC because they are better resourced. Even though rural respondents mentioned many barriers to technology and infrastructure, they were not as well heard. In a more limited scope of future research, all participants could be from rural schools, examining how policy goals like Digital Uzbekistan 2030 target these schools and what happens to funding and creative teaching in impoverished contexts.

Focus on Certain Types of Digital Aids

This study included an analysis of the popular online tools, including Kahoot, Quizizz, Miro, and Canva, which are characteristic of the MA EDIN program's digital ecosystem. There is a possibility that this focus neglected some other contextually relevant innovative tools and pedagogy. Participants were as likely to want to promote the program's attention as to ignore what they considered better for the DPC. More varied conclusions on DPC implementation could be drawn if further studies were done with wider parameters concerning the tools, including user-generated ones.

Reflexive and Ethical Issues

This reflexivity and positionality scope alongside the process describes specific qualitative methods; some aspects of the study may have bias. Some respondents might have responded in a certain way to not disappoint the researcher within the bounds of the program. While these impacts were reduced through transparency and maintenance of reflexive journals, they still exist and cannot be eliminated entirely (Creswell & Poth, 2016). Other researchers external to the study or anonymous digital surveys could be incorporated into the research design to help alleviate concerns around reflexivity.

This study adds value to the perception and practice of the DPC learning process within teacher education programs in Uzbekistan, though there are gaps in the findings. Understanding these gaps provides a starting point for enhancing methodological strength in subsequent studies, particularly by:

- ❖ Increasing the sample size to improve generalizability.
- ❖ Incorporating other objective methods to lessen self-reporting.
- ❖ Conducting the research using a longitudinal approach to assess the lasting effects of the program.
- ❖ Investigate further into less studied areas that face technological and institutional infrastructure gaps.

Recognizing these boundaries is an opportunity to rework future research strategies. A broader scope, when framed alongside contextual considerations, will enhance the understanding of pedagogical creativity as technology integrates with changing education systems.

8.5. Recommendations for Future Research

Considering the results and the constraints noted in this study, there are several possibilities for further research. These suggestions are intended to broaden the insights of Digital

Pedagogical Creativity (DPC) concerning its application in teacher education programs in Uzbekistan and other post-Soviet countries. If these gaps are met in future studies, they will be more complete, sensitive to the context, and relevant to the world in terms of how digital tools nurture creativity in education.

1. Sustaining DPC longitudinal studies

This research captured only a moment of some of the participants' experiences within the MA EDIN program, and how they engage in sustained usage of digital creativity over time is unknown. The focus for future research would be building longitudinal studies that investigate the practices of teacher candidates and how they do or do not employ DPC in their post-graduation teaching practice. Also, determining the degree to which institutional and professional contexts are supportive of their work practices in different educational environments impacts their activities. Ertmer and Glazewski (2012) identified that professional development seems more effective when it is tracked longitudinally. From this approach, it would be possible to understand how DPC is transformed through a cycle of sustained practice, reflection, and refinement in response to changing educational needs.

2. Comparative International Research

The results underscore the role cultural and contextual elements play in interpreting and using digital tools. This research, however, centers on Uzbekistan and its unique post-Soviet institutional and cultural setting. Further research would focus on comparative studies with Uzbekistan and other post-Soviet or developing countries. Then analyze the impact of established cultural norms, institutional policies, and the existence of digital infrastructure on the DPC adoption rate. As Selwyn (2016) puts it, pedagogy in Selwyn's (2016) terms is digital; it is very much dependent on the situation. Differences across areas might reveal how digital creativity is conceived globally while bringing context-based issues.

3. Research on Underrepresented and Rural Areas

The findings have shown significant barriers experienced by rural schools in adopting DPC, emphasizing a vast digital divide. These barriers involve lack of adequate internet access, obsolete technology, and insufficient professional training. The focus for further research would be investigating the impact of resource constraints on the development of digital creativity in teachers and students in rural schools. Examining the rural response to policy programs like Digital Uzbekistan 2030 and how those policies are implemented. Warschauer and Matuchniak's (2010) research demonstrated that the digital divide reinforces educational inequalities. Gaining insight into the experiences of rural teachers could help develop policies aimed at reducing the digital divide.

4. Extending the Boundaries of Digital Tools

This research was restricted to a set of digital tools like Kahoot, Canva, Miro, and Google Classroom, as they represented the digitized environment of the MA EDIN program. Nevertheless, other platforms exist that can stimulate creativity in various other educational settings. The focus of further research would be addressing the use of digital tools like virtual reality (VR), augmented reality (AR), and artificial intelligence (AI) in schools. Also, studying the effects of new technologies on creative thinking, teamwork, and problem-solving ability. Harris and Hofer (2009) suggest that the choice of technology determines the degree of creative achievement. Broadening the range of tools to be included will increase the likelihood of discovering how various tools and platforms enhance creativity in different educational settings.

5. Studying the Role of Emotional Engagement in DPC as a Teacher Training Process

Emotional engagement as a key component of creativity is central to Rodney's Creativity Model (2024) and Csikszentmihalyi's (1996) Flow Theory. The results suggest that teachers were willing to try using digital tools to teach when the children's emotional engagement was favorable. The focus of further research would be studying the impact of

emotional engagement on teachers' motivation and students' creativity in the context of using digital tools. Also, testing the hypothesis that interactive tools, such as Padlet and Zoom breakout rooms, increase emotional engagement more than non-interactive ones. Emotions are believed to facilitate cognitive processes. Grasping emotional aspects may assist educators with developing high interest learning environments.

6. Influence of Institutional Policies and Professional Development

The results suggest that institutional support and professional development have a significant impact on the integration of DPC by the teachers. Nevertheless, there was a lack of organized training and little policy guidance about infusing imagination into digital pedagogy. The focus of future research would be examining the effects that institutional policies have on the quantity and quality of DPC activities performed. Moreover, determining the impact of active professional development courses on teachers' ability to retain imaginative work. Voogt et al. (2012) emphasize that there is a need for consistent support to perpetuate the integration of technology. Examining how policies are enacted in practice could contribute to policy change at the institutional level.

7. Looking into Learners' Views of DPC

The emphasis of the current study was on student teachers' views, but students as the ultimate consumers of digital pedagogical creativity should also be examined. Their perception and experience as learners of these digital tools will provide important information regarding the impact of DPC on learning outcomes. The focus of future research would be investigating how students perceive the effects of gamification, digital storytelling, and collaborative tools on learning. Also, studying how DPC enhances students' motivation, critical thinking, and cooperation skills. Christensen (1997) claims that new technologies in education will only be beneficial if they lead to enhanced results for the students. Student responses could either support or dispute teacher assumptions regarding the elements of digital creativity.

These recommendations highlight that deeper systematic research on digital pedagogical creativity, which captures inclusivity, diversity, and context, is urgently necessary. Studies conducted in these new directions, whether spatial, methodological, or theoretical, could benefit policymakers, educators, and institutions as they seek to develop just, creative, and equitable learning environments that prepare learners for the uncertainties of the future. Subsequent research will improve understanding of how DPC is created and maintained in the context of rapid changes in education systems and structures. This will be important for policy and decision-makers, teachers, and international researchers working to develop open and creative education systems.

Digital Media in DDP

Digital media were essential in developing, tracking and reporting on this Doctoral Development Project (DDP). During the research, different digital media were utilized to:

- ❖ Present the research outputs,
- ❖ Depict the experiences of the participants, and
- ❖ Interact with other scholars in the field.

The integration of digital media demonstrates the commitment of study to the advancement of Digital Pedagogical Creativity (DPC) not only as an area of study but also as a methodological approach in the dissemination of knowledge. This portion describes how digital media was used in the research process by developing websites, social media, and other digital materials.

1. Personal Site as a Research Base

During the EdD program, a personal, professional website was designed to display research work that is still in progress and report research results. The link to the site is <https://sites.google.com/view/rokhatoyboltaeva> It contains the Research Page section, which has a subpage, “Doctoral Digital Portfolio,” that has no other information aside from what is available on the web. The page contains:

- ❖ Infographics, word clouds, and concept maps created using Canva to illustrate the findings in appealing ways.
- ❖ Participants’ anonymous quotes portray real engagements with digital pedagogy.
- ❖ Pages containing digital work by students, such as video clips and storyboards.

The website collected user contributions from educators, researchers, and politicians interested in utilizing the research and permitted participation in such a process.

2. Combination with Digital Artifacts

The following digital artifacts were created by users: storytelling videos, storyboards, persona and Canva presentations. These presentations were important for harnessing the creative talents of participants and became the main source of basic data for thematic analysis. Miro and Animaker were utilized to create graphics that represented the problem-solving activities of the participants. Analyzing these artifacts in NVivo showed how participants used digital technologies to stimulate their imagination, work together, and think about what they had learned. These artifacts added to the DDP presented results and illustrated how DPC could be implemented within real-life educational settings.

3. Social Media Platforms for Research Dissemination

Research engagement and visibility on larger public platforms were achieved through social media, especially LinkedIn, Facebook, and Instagram. The research project was publicly advertised on LinkedIn, and posts describing the core results and the ongoing work were displayed. International educators and researchers were reached using pertinent hashtags like #digitalpedagogy, #UzbekEducation, and #TeachEd. Posts included other visual infographics depicting the summaries of the results, thoughts on the overall research process, and accomplishments towards completing the research milestones.

Social media has made it easier for minimalistic self-presentation, feedback reception, and collaboration with researchers from other countries.

4. Influence of Digital Media on Dissemination of Research Information

The DDP results were more accessible and visible through digital media because of the adoption of several means for disseminating research results (written reports, visual aids and interactivity). Also, the researcher asked other peers, educators, and researchers to provide comments and feedback. The researcher provided research information for free, unlike published journals that catered to restricted readership instead of supporting open science. This aligns with other research that navigates digital reporting to solve the divide between formal scholarship and real-world ‘issues’ (Selwyn, 2016). It also demonstrates the focus of the study on digital pedagogical creativity not only as a research issue but as an engagement strategy.

Using corporate websites, digital artifacts, and social media, the DDP adopted digital creativity both in form and content. This incorporation demonstrates the capability of digital media to improve the distribution of information, promote public participation, and aid the establishment of an international research collaboration.

Table 5. What could be done for my DDP’s digital media.

Author(s)	Year	Key Terms	Annotation	Ideas for DDP Representation
Abdukarimova & Ergashev	2024	Digital transformation, language education, online platforms	Looks at the effects of technologies on language teaching in Uzbekistan, especially regarding online platforms and mobile applications	Make an infographic and post on my website with gadgets used by MA students to foster pedagogical creativity
Abildinova et al.	2024	Active teaching methods, digital integration, PBL	Covers the way educators use PBL as a strategy to foster engagement and active learning alongside technological integration	Create an interactive webpage on how PBL can foster creativity in digital pedagogy among MA students.

Akujeze	2024	Digital pedagogy, teacher training, online assessment	Studies digital pedagogy in the context of teacher education through simulations, online assessments, and other collaborative technologies	Post an animated explainer video on my site on how digital storytelling contributes to teacher training.
Greenhow, P., & Robelia, B.	2009	Educational technology integration, new learning experiences	Examines how technology can create engaging learning experiences beyond traditional methods.	Feature participant quotes about a creative use of technology in their teaching on my website or social media.
Schmoelz	2018	Co-creativity, digital storytelling, education	The impact of digital storytelling on collaboration and problem-solving.	Post on my website participants' digital storytelling videos
Koehler, M. J., & Mishra, P.	2006	Technological Pedagogical Content Knowledge (TPACK)	Introduces the TPACK framework, emphasizes integrating technology effectively with content and pedagogy.	Developing a concept map on my website visually illustrates the relationships between TPACK and digital pedagogical creativity.
Sullivan	2017	Creativity, technology, learning environments	Analyzes how digital technologies are incorporated into teaching and their impact on creativity.	Write blog posts on strategies to foster digital creativity based on teachers' experiences.
Yang, Chen & Hung	2022	Digital storytelling, interdisciplinary learning	Talks about the scope of DST in the areas of English-speaking skills and imagination.	Create a video guide on how MA students formulate digital storytelling projects.

References

- Abildinova, G., Abdykerimova, E., Assainova, A., Mukhtarkyzy, K., & Abykenova, D. (2024, November). Preparing educators for the digital age: teacher perceptions of active teaching methods and digital integration. In *Frontiers in Education* (Vol. 9, p. 1473766). Frontiers Media SA.
- Adeel, A., Batoool, S., & Madni, Z. U. A. (2023). Intrinsic motivation and creativity: the role of digital technology and knowledge integration ability in facilitating creativity. *International Journal of Management Studies (IJMS)*, 30(1), 1-36.
- Ahn, S., & Oh, K. (2024, September). An analysis of the effects of learner-centered software education and required support strategies. In *Frontiers in Education* (Vol. 9, p. 1434700). Frontiers Media SA.
- Akujjeze, M. O. (2024). The role of digital pedagogy in enhancing teacher education. *Open Access Journal of Education & Language Studies*, 1(3), 001-008.
- Amabile, T. M. (1983). The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45(2), 357–376. <https://doi.org/10.1037/0022-3514.45.2.357>
- Barajas, M., Frossard, F., & Trifonova, A. (2018). Strategies for digital creative pedagogies in today's education. *Capítol 8 del llibre: Brito, Silvio Manuel (Ed.). 2018. Active Learning. InTech. ISBN: 978-1-83962-245-8. DOI: 10.5772/intechopen.73460. pp: 107-120.*
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W. H. Freeman.
- Baran, E., Chuang, H. H., & Thompson, A. (2011). TPACK: An emerging research and development tool for teacher educators. *Turkish Online Journal of Educational Technology-TOJET*, 10(4), 370-377.
- Bates, T. (2016). *Teaching in a digital age: Guidelines for designing teaching and learning*.
- Bazeley, P., & Jackson, K. (2013). *Qualitative data analysis with NVivo*. SAGE Publications.
- Beghetto, R. A., & Kaufman, J. C. (2014). Classroom contexts for creativity. *High Ability Studies*, 25(1), 53–69. <https://doi.org/10.1080/13598139.2014.905247>
- Belda-Medina, J. (2022). Promoting inclusiveness, creativity and critical thinking through digital storytelling among EFL teacher candidates. *International Journal of Inclusive Education*, 26(2), 109-123.
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative research journal*, 9(2), 27-40.

- Branch, R. M., & Merrill, M. D. (2012). Characteristics of instructional design models. *Trends and issues in instructional design and technology*, 3, 8-16.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Chen, W., Wang, B., Chen, Y., Zhang, J., & Xiao, Y. (2023). New exploration of creativity: Cross-validation analysis of the factors influencing multiteam digital creativity in the transition phase. *Frontiers in Psychology*, 14, 1102085.
- Christensen, C. M. (1997). Marketing strategy: learning by doing. *Harvard business review*, 75(6), 141-151.
- Cox, H. (2024). *Technology in the Art Classroom: Drawbacks and Best Practices for Digital Creativity* (Master's thesis, The University of the Arts).
- Craft, A. (2005). *Creativity in schools: Tensions and dilemmas*. Routledge.
- Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.
- Csikszentmihalyi M. (1996). *Creativity: Flow and the psychology of discovery and invention*. HarperCollins.
- Darling-Hammond, L., & Bransford, J. (Eds.). (2007). *Preparing teachers for a changing world: What teachers should learn and be able to do*. John Wiley & Sons.
- Eickelman, D. F. (1998). *The Middle East and central Asia: an anthropological approach*. Routledge.
- Elicker, A. T., Barbosa, D., & Martins, Dr. R. (2022). Creative approach as a teaching proposal to develop the Digital Literacy. *International Journal for Innovation Education and Research*, 10(6), 147–159. <https://doi.org/10.31686/ijer.vol10.iss6.3779>
- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, 42(3), 255–284. <https://doi.org/10.1080/15391523.2010.10782551>
- Ertmer, P. A., & Glazewski, K. D. (2012). Fostering complex problem-solving for diverse learners: Engaging an ethos of intentionality toward equitable access. *Educational Technology Research and Development*, 68(2), 679-702.
- Glăveanu, V. P. (2008). Thinking outside the box of individualism: Creativity in light of a socio-cultural approach. *Europe's Journal of Psychology*, 4(4).

- Greenhow, C., Robelia, B., & Hughes, J. E. (2009). Learning, teaching, and scholarship in a digital age: Web 2.0 and classroom research: What path should we take now?. *Educational researcher*, 38(4), 246-259.
- Guilford, J. P. (1967). The nature of human intelligence.
- Gulyamov, S., Karieva, G., & Rasulova, M. (2023). Experience of development of digital technologies in Uzbekistan. In *E3S Web of Conferences* (Vol. 389, p. 03040). EDP Sciences.
- HANIFAH, S. S. A., GHAZALI, N., & AYUB, A. F. M. (2022, November). Factors Influencing teachers' use of digital technology: A structural model. In *International Conference on Computers in Education* (pp. 197-207).
- Harris, J., & Hofer, M. (2009). Instructional planning activity types as vehicles for curriculum-based TPACK development. *Research Highlights in Technology and Teacher Education*, 2009(1), 99–108.
- Henriksen, D., Mishra, P., & Fisser, P. (2016). Infusing creativity and technology in 21st century education: A systemic view for change. *Educational Technology & Society*, 19(3), 27–37.
- Huisman, J., Smolentseva, A., & Froumin, I. (2018). *25 years of transformations of higher education systems in post-soviet countries: Reform and continuity* (p. 482). Springer Nature.
- Ifenthaler, D., & Schweinbenz, V. (2016). Students' acceptance of tablet PCs in the classroom. *Journal of Research on Technology in Education*, 48(4), 306–321. <https://doi.org/10.1080/15391523.2016.1215172>
- Koehler, M. J., & Mishra, P. (2006). What happens when Teachers Design Educational Technology? The development of Technological Pedagogical Content Knowledge. *Journal of Educational Computing Research*, 32(2), 131–152.
- Koehler, M., Greenhalgh, S., Rosenberg, J., & Keenan, S. (2017). What tech is going on with teachers' digital teaching portfolios? Using the TPACK framework to analyze teachers' technological understanding. *Journal of Technology and Teacher Education*, 25(1), 31-59.
- Kovpak, V., & Lebid, N. (2022). Creative industries as a mechanism of creative economy and Strategic Communications. *Baltic Journal of Economic Studies*, 8(4), 102–109. <https://doi.org/10.30525/2256-0742/2022-8-4-102-109>
- Krueger, R. A. (2014). *Focus groups: A practical guide for applied research*. Sage publications.

- Kvale, S., & Brinkmann, S. (2009). *InterViews: Learning the craft of qualitative research interviewing* (2nd ed.). SAGE Publications.
- Makarova, E., L. Makarova, E., & A. Egorova, I. (2021). International Student Exchange Management as factor of Educational Services Development. *International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE)*, 9(1), 75–90. <https://doi.org/10.23947/2334-8496-2021-9-1-75-90>
- Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. Jossey-Bass.
- Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*, 108(6), 1017-1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Moradi, H., & Chen, H. (2019). Digital storytelling in language education. *Behavioral sciences*, 9(12), 147.
- Mubinabonu, A., & Sohib, E. R. (2024). TECHNOLOGICAL TRANSFORMATIONS IN UZBEKISTAN'S LANGUAGE CLASSROOMS: A GATEWAY TO GLOBALIZED EDUCATION. *American Journal Of Social Sciences And Humanity Research*, 4(02), 50-59.
- Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). SAGE Publications.
- Pozilova, S. K. (2023). Developing Professional Creativity of Teachers Based on Problem Based Learning (PBL). *Acta Pedagogia Asiana*, 2(2), 106-114.
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1–6.
- Presidential Decree PF-5847-coH (2019) 08.10.2019. *O'zbekiston respublikasi oliy ta'lim*. lex.uz. <https://lex.uz/ru/docs/-4545884>
- Presidential Decree PF-6079. (2020). On approval of the "Digital Uzbekistan 2030" strategy and measures for its effective implementation. Lex.uz. <https://lex.uz/ru/docs/-5030957>
- Ranjan, R., & Rana, P. (2023). Emerging technology and pedagogical application in design education. *International Journal of Emerging and Disruptive Innovation in Education: VISIONARIUM*, 1(1), 1–10.
- Rasulova, D. R., & Nizomova, T. J. (2024). Addressing Digital Literacy Gap Among Students and Educators in Uzbekistan. *Miasto Przyszłości*, 49, 796-798.
- Robinson, K. (2011). *Out of our minds: The power of being creative*. Capstone.

- Rocha, A. M. M. D., Mota, P. A. D. S., & Coutinho, C. P. (2011). TPACK: Challenges for teacher education in the 21st century.
- Rodney, B. (2024). *Creativity model for teacher education* [Unpublished internal framework]. Webster University.
- Rogers, E.M. (2003) Diffusion of Innovations. Free Press, New York.
- Ruziev, K., & Burkhanov, U. (2018). Uzbekistan: Higher education reforms and the changing landscape since independence. *25 years of transformations of higher education systems in post-Soviet countries: Reform and continuity*, 435-459.
- Sabirova, U. (2020). Innovation in the processes of reforming the higher education system in Uzbekistan. *International Journal of Psychosocial Rehabilitation*, 24(S1), 551-560.
- Saldaña, J. (2021). *The coding manual for qualitative researchers* (4th ed.). SAGE Publications.
- Saltık Ayhanöz, G., & Kahraman, E. (2023). Özel Yetenekli Öğrencilerin Geometri Tarihi Hakkında Hazırladıkları Dijital Öyküler Üzerine Bir Araştırma. *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi*, 42(2), 607-678
- Sam, R. (2024). Challenges and opportunities of educational technology integration in Cambodian higher education institutions: A literature review. *Available at SSRN 4849873*.
- Sawyer, R. K. (2012). *Explaining creativity: The science of human innovation*. Oxford University Press.
- Sayı, A.K. (2022). Digital Differentiation as a Form of Pedagogical Creativity. *Creativity as Progressive Pedagogy*.
- Schmoelz, A. (2018). Enabling co-creativity through digital storytelling in education. *Thinking skills and creativity*, 28, 1-13.
- Selfa-Sastre, M., Pifarré, M., Cujba, A., Cutillas, L., & Falguera, E. (2022). The role of digital technologies to promote collaborative creativity in language education. *Frontiers in Psychology*, 13, 828981.
- Selwyn, N. (2016). *Is technology good for education?* Polity Press.
- Sharipjonovich, U. O. (2019). INTEGRATION OF HIGHER EDUCATION OF THE REPUBLIC OF UZBEKISTAN AND FOREIGN STATES. *European Journal of Research and Reflection in Educational Sciences Vol*, 7(12).

- Shelley, M., & Kiray, S. A. (Eds.). (2019). Education research highlights in mathematics, science and technology 2019. ISRES Publishing.
- Silova, I. (2009). Varieties of educational transformation: The post-socialist states of Central/Southeastern Europe and the former Soviet Union. In *International handbook of comparative education* (pp. 295-320). Dordrecht: Springer Netherlands.
- Stake, R. E. (1995). *The art of case study research*. SAGE Publications.
- Sullivan, F. R. (2017). *Creativity, technology, and learning: Theory for classroom practice*. Routledge.
- Tamim, R. M., Bernard, R. M., Borokhovski, E., Abrami, P. C., & Schmid, R. F. (2011). What forty years of research says about the impact of technology on learning. *Review of Educational Research*, 81(1), 4–28. <https://doi.org/10.3102/0034654310393361>
- Tang, C., Mao, S., Naumann, S. E., & Xing, Z. (2022). Improving student creativity through digital technology products: A literature review. *Thinking Skills and Creativity*, 44, 101032.
- Thyssen, C., Huwer, J., Irion, T., & Schaal, S. (2023). From TPACK to DPACK: The “Digitally-related pedagogical and content knowledge”-model in STEM-education. *Education sciences*, 13(8), 769.
- Tracy, S. J. (2010). Qualitative quality: Eight “big-tent” criteria for excellent qualitative research. *Qualitative inquiry*, 16(10), 837-851.
- Tregubova, T. (2021). Benchmarking of University Teachers’ Professional Development: Successful European, Chinese, and Russian practices. *SHS Web of Conferences*, 99, 01004. <https://doi.org/10.1051/shsconf/20219901004>
- UNESCO. (2020). *Global education monitoring report 2020: Inclusion and education – All means all*. United Nations Educational, Scientific and Cultural Organization. <https://en.unesco.org/gem-report/report/2020/inclusion>
- Usmonov, B. (2018). The Educational and Research Centres in Universities. *Journal Higher Education Research*, 3(1), 1-5.
- Voogt, J., Fisser, P., Pareja Roblin, N., Tondeur, J., & van Braak, J. (2012). Technological pedagogical content knowledge – A review of the literature. *Journal of Computer Assisted Learning*, 29(2), 109–121. <https://doi.org/10.1111/j.1365-2729.2012.00487.x>
- Wang, J. (2024). Middle School Art Teachers’ Smart Teaching Ability under the TPACK Framework: Structural Model, Mechanism and Enhancement Strategy. *International Journal of Learning and Teaching* (4).

- Warschauer, M., & Matuchniak, T. (2010). New Technology and Digital Worlds: Analyzing Evidence of equity in access, use, and outcomes. *Review of Research in Education*, 34(1), 179–225. <https://doi.org/10.3102/0091732x09349791>
- Webb, A., & Layton, J. (2023). ‘It’s not just about technology!’: Creativity as a driving force for nurturing the development of skills for digital performance. *International journal of performance arts and digital media*, 19(3), 386-404.
- Wisanti, W., Indah, N. K., & Putri, E. K. (2024). Scientific digital poster assignments: strengthen concepts, train creativity, and communication skills. *International Journal of Evaluation and Research in Education (IJERE)*, 13, 1035-44.
- Yang, Y. T. C., Chen, Y. C., & Hung, H. T. (2022). Digital storytelling as an interdisciplinary project to improve students’ English speaking and creative thinking. *Computer Assisted Language Learning*, 35(4), 840-862.
- Yin, R. K. (2009). *Case study research: Design and methods* (Vol. 5). SAGE Publications
- Zayas, J. D. M., & Rofi'ah, N. (2022). The effect of digital literacy skills on improving teacher creativity. *INSECTA: Integrative Science Education and Teaching Activity Journal*, 3(2), 168-174.

Appendices

Appendix A Recruitment email

Dear Participant,

I hope you are doing well and reading this email, which is an invitation for participation in the research project on the topic " Digital Pedagogical Creativity among Teacher Candidates in a Creativity-Centered University Program".

You are selected for the research as participants because we need your insights and opinions—being a master's degree student in Tashkent and working as a teacher in educational places—to explore the theme. We are interested in hearing your opinions on how teaching and learning in higher education are affected by the creative use of digital pedagogy.

As part of this study, you will be invited to participate in semi-structured interviews and focus group discussions. Your participation is entirely voluntary, and any information you provide will be kept confidential and used solely for research purposes. If you would want more details about the study or would like to participate, don't hesitate to contact me at rokhatoyboltaeva@webster.edu

Appendix B Interview Questions

1. What is your understanding of digital pedagogical creativity?
2. In your opinion, how does digital pedagogical creativity transform teaching and learning?
3. Can you show instances where you have integrated digital pedagogical creativity into your teaching approaches?
4. When it came to introducing digital pedagogical creativity in the classroom, what problems have you encountered?
5. How can better student engagement and learning outcomes be realized through the use of the best practices on digital pedagogical creativity as per your own view?
6. By what means did you evaluate the success of initiatives including a move towards digital pedagogical creativity?
7. Have you ever undergone any training or attended workshops about using technology in education? Has it altered anything about how you teach? If yes, explain briefly.
8. Do you mind sharing some significant events or examples that illustrate your use of digital pedagogical creativity in class?
9. Which resources and support would enable improvement of your ability with respect to digital pedagogical creativity?
10. Regarding the future of education, do you believe that there is a role for digital pedagogical creativity?

Appendix C Focus Group Questions

1. What do you think about the creative use of technology in education?
2. How Digital Pedagogical Creativity improves student learning and engagement?
3. Could you give instances of digital pedagogical innovation undertakings that you may have witnessed or carried out in your school system?
4. What barriers do you see to the successful integration of digital pedagogical creativity into teaching practices?
5. What are the most important principles for effective activity promoting digital pedagogical creativity according to what you saw?
6. How do you believe that digital pedagogical creativity meets different learning needs of students?
7. How does technology support creativity in classrooms from your view point?
8. In terms of digital pedagogical creativity, how is the future of education like in your view?
9. In your opinion, which tools and direction are needed by teachers to successfully adopt an approach toward integrating digital pedagogical creativity into their lessons?
10. If teachers wish to develop their digital pedagogical creativity, what advice would be good to offer them?

Appendix D Informed Consent Form

Title of DDP: Digital Pedagogical Creativity among Teacher Candidates in a Creativity-Centered University Program

Researcher: Rokhatoy Boltaeva

Introduction: Rokhatoy Boltaeva, an EdD candidate at Webster University, is inviting you to take part in a research study, as part of her Doctoral Dissertation Project (DDP) on digital pedagogical innovation among MA students. The purpose of this study is to study teacher candidates' perceptions and experiences about the use of digital pedagogical creativity in classroom environments.

The aim of this research is to explore perceptions, thoughts and challenges that are faced by the teacher candidates when they employ digital pedagogical creativity in their teaching. By so doing, we will be able to conceive more appropriate ways of implementing digital pedagogical creativity in order to enhance learning outcomes.

Procedure: Participating in this study means you will have an individual interview and focus group discussions. We will either conduct the interviews face-to-face or online depending on what fits your schedule best. Discussions and interviews will be recorded for future reference and analysis purposes. If necessary, you may listen to the tapes for verification purposes.

Voluntary Participation: There are no penalties attached to your participation in this research; moreover, you can discontinue being part of it at any given time or decide not to go on with it without any consequences. It does not matter what decision you make as far as Webster University is concerned both now and later on.

Confidentiality: During the course of study, we shall ensure that your confidentiality and privacy are maintained by taking special care only accessible by confidential information collected in the study which is made known only to the researcher and other authorized personnel on the project. Your name will not be revealed but will be kept anonymous in the upcoming publishing papers or reports that come out of this research.

Benefits and Risks: There are very few risks associated with participating in this study, other than the possibility of feeling awkward sharing personal experiences. Nonetheless, the advantages include the ability to enhance teaching methods and further understanding in the area of digital pedagogical creativity.

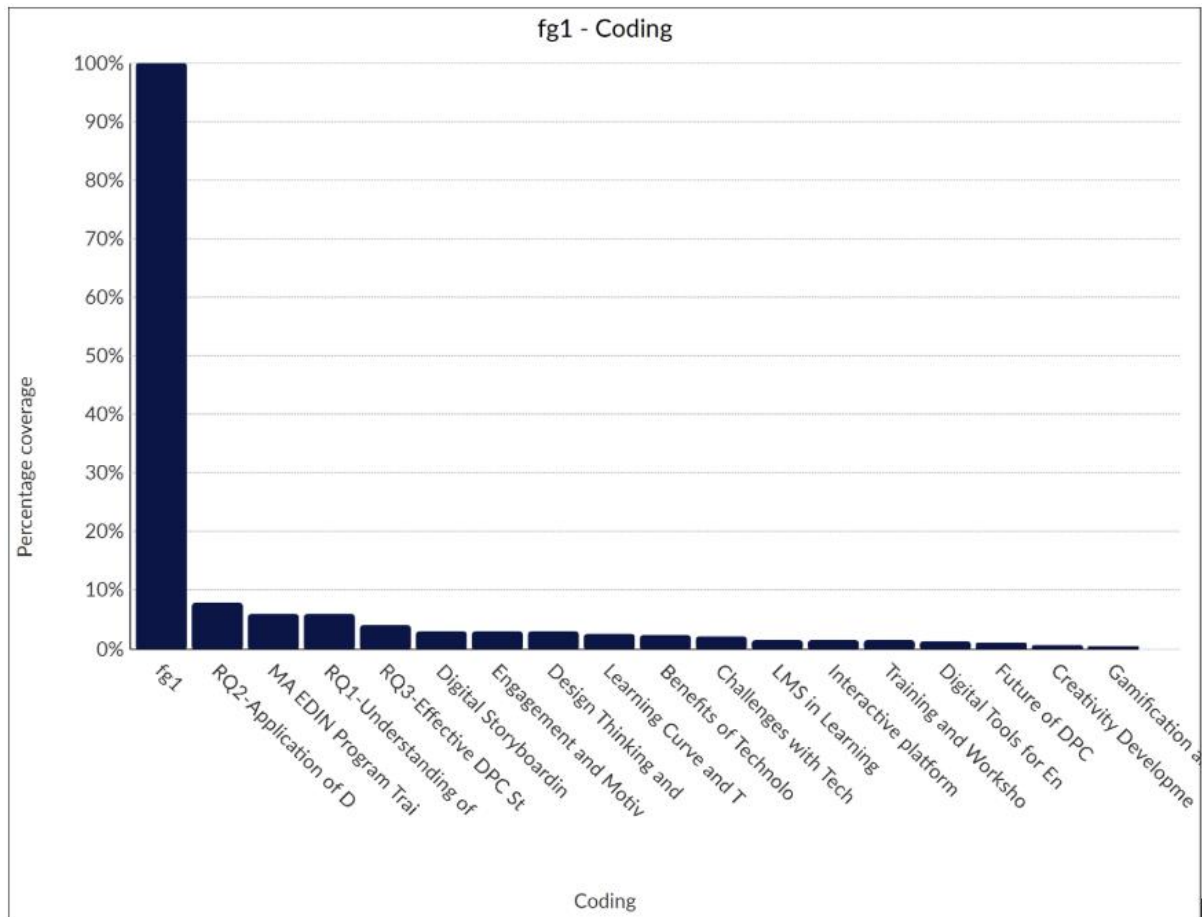
Contact Information: If you have any questions, concerns, or complaints about the study, you can contact me rokhatoyboltaeva@webster.edu . Additionally, if you have any questions regarding your rights as a participant, you can contact the Institutional Review Board (IRB) at irb@webster.edu .

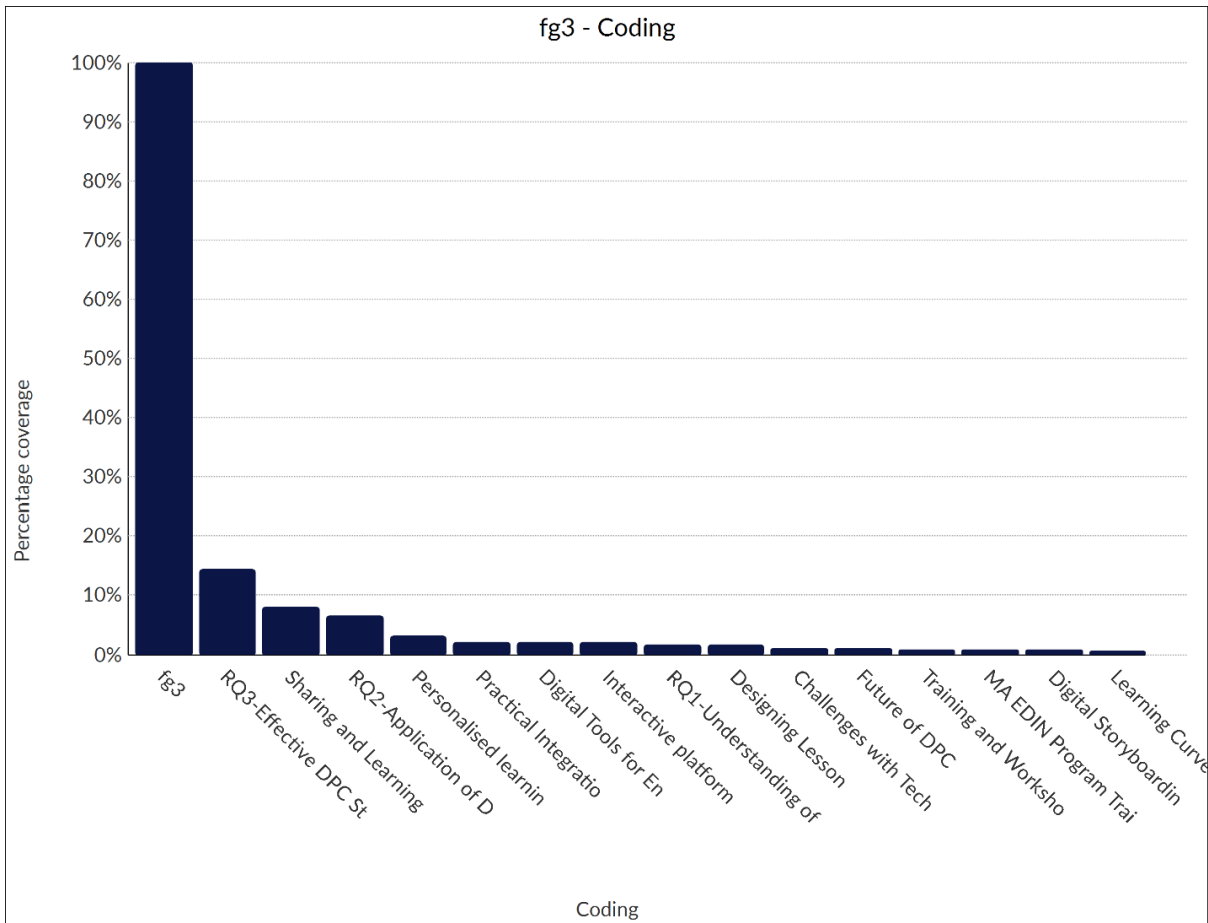
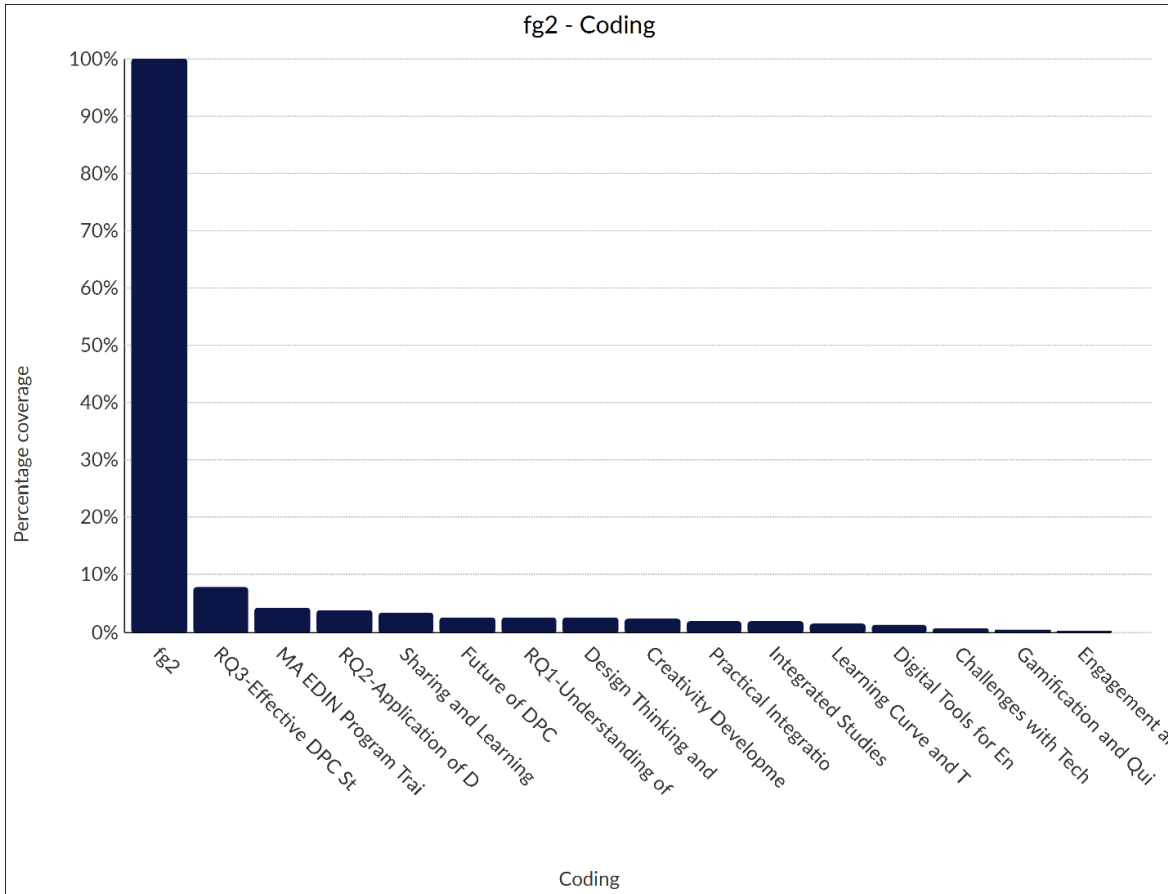
Consent: You acknowledge that you have carefully read and understood the information provided in this consent form and agree to take part in the study.

Participant's Signature: _____ Date: _____

Researcher's Signature: _____ Date: _____

Appendix E Themes and Coding for the focus groups



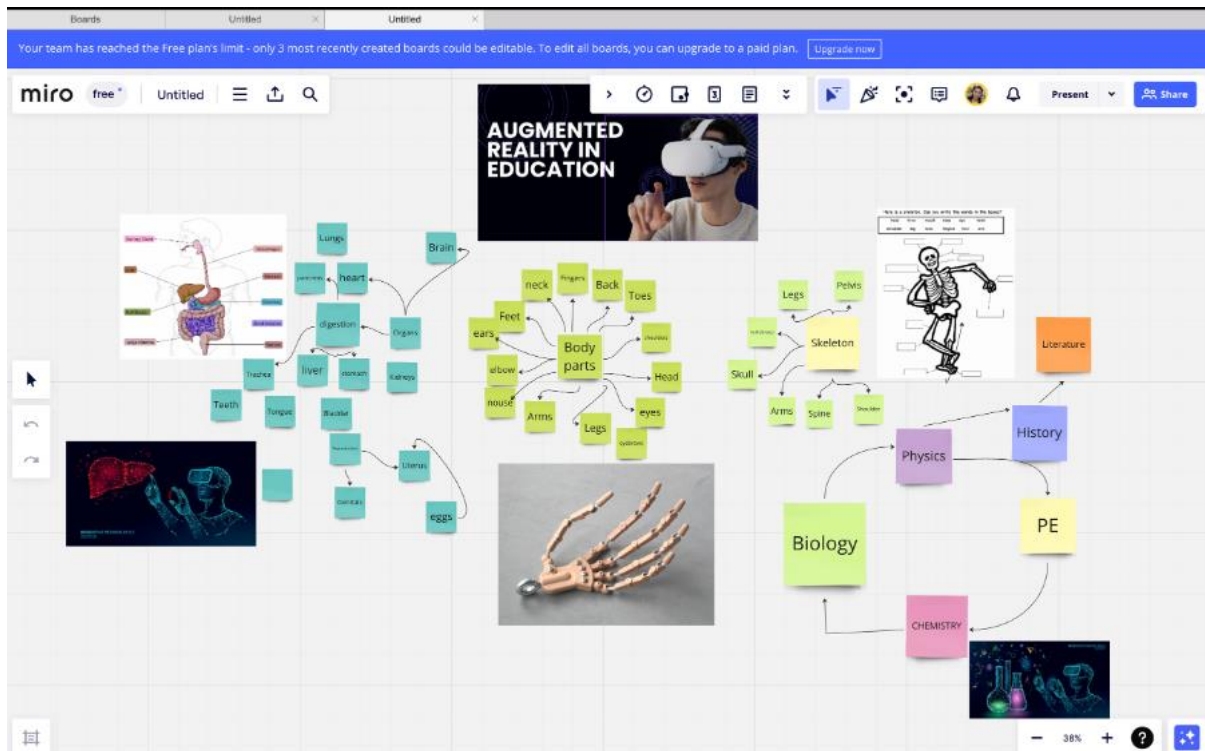


Appendix F Color-coding of the Themes and Codes

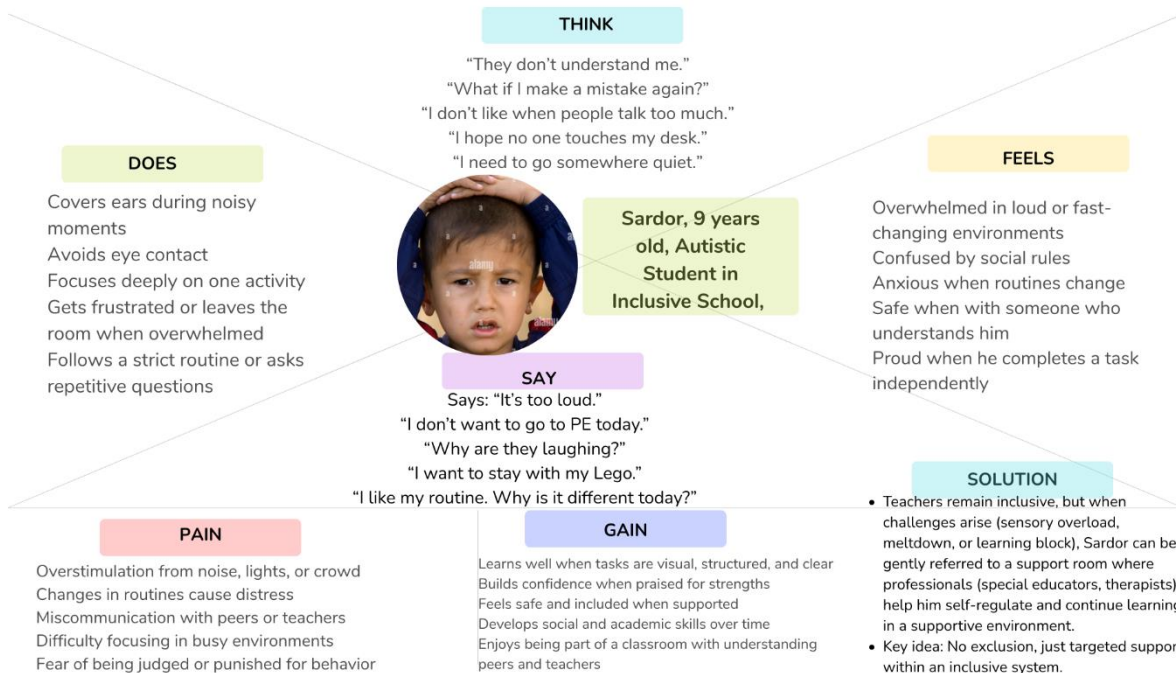
RQ3-Challenges and Effective DPC Strategies			RQ1-Understanding of DPC	
Challenges with Technology	Future of DPC	Sharing and Lear...	Creativity Dev...	Engagemen...
Training and Workshops	Evaluation of D...	Interactive platforms	Innovative Teaching M...	Designing Lesson
		Learning Curve and T...		
RQ2-Application of DPC in Teaching			MA EDIN Program Training	
Practical Integration of...	Gamification and Quizzes	Digital Tools for ...	Design Thi...	Digital Story...
	Personalised learning	Tea... Retentio... LMS in ...		Integrated S...

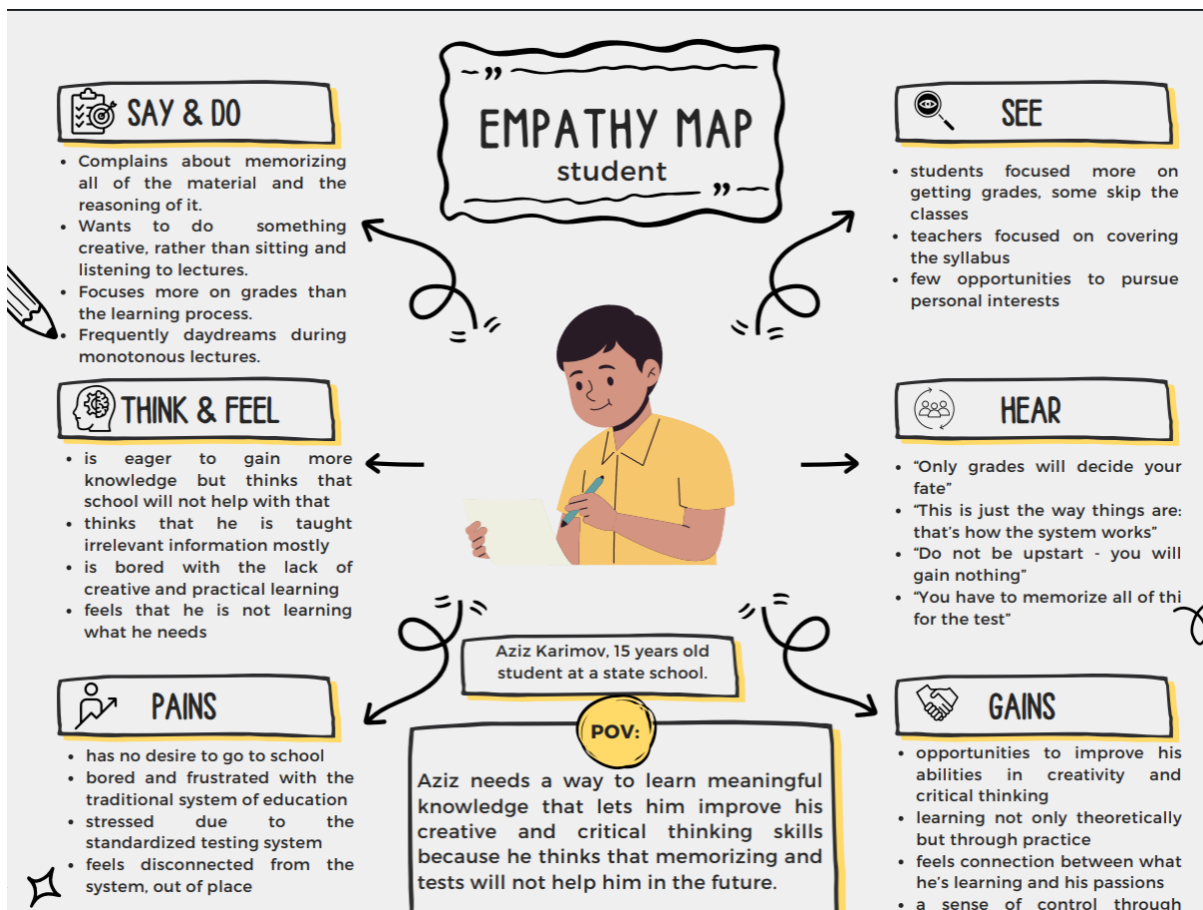
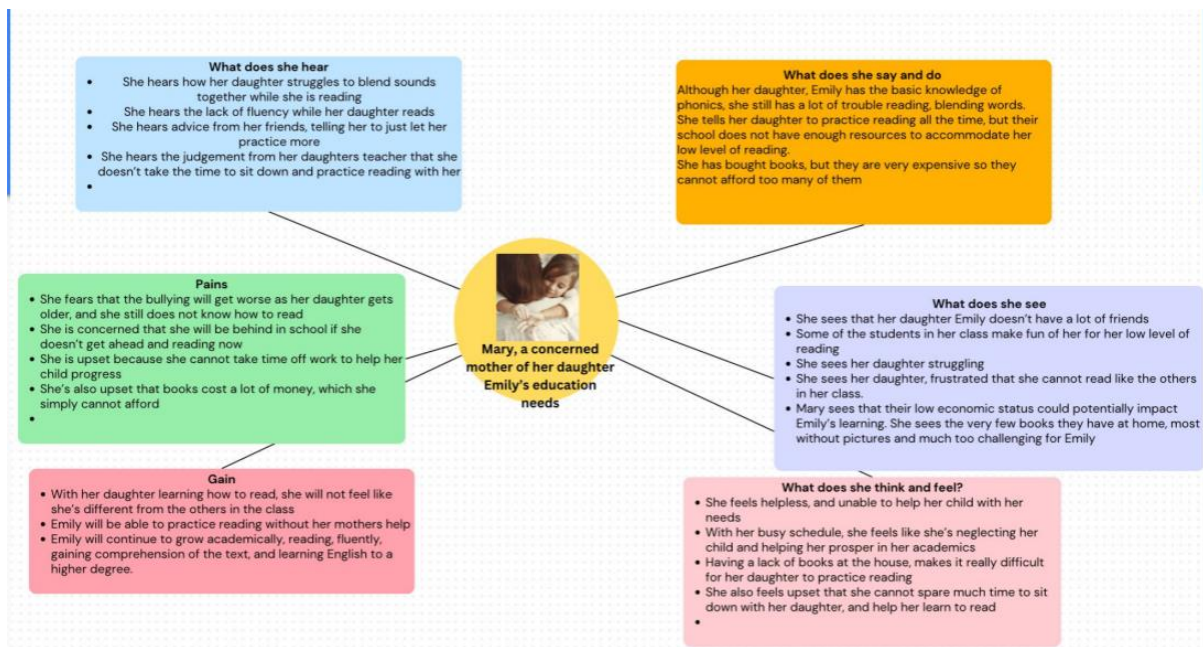
Appendix G Digital Artifacts

MiroBoard Collaboration

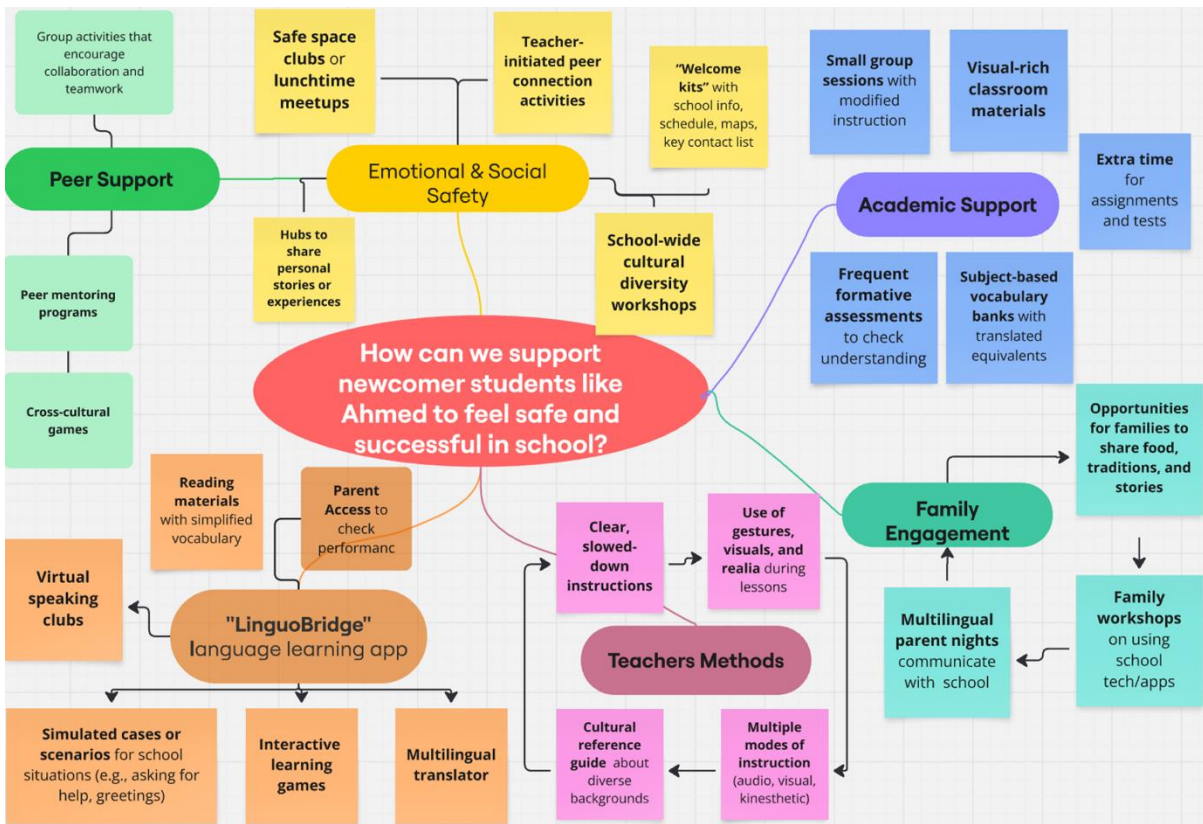
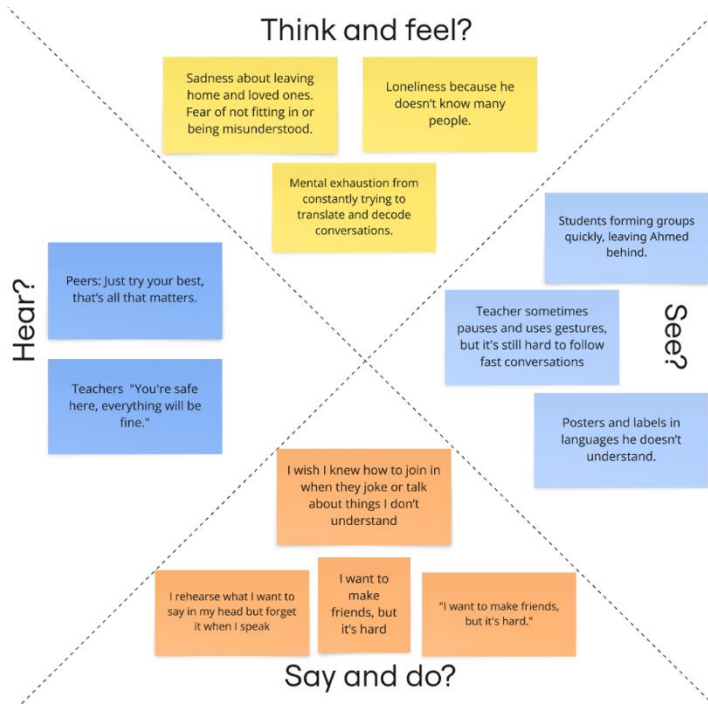


Personas





EMPATHY MAP



Digital Storytelling videos

Ideate

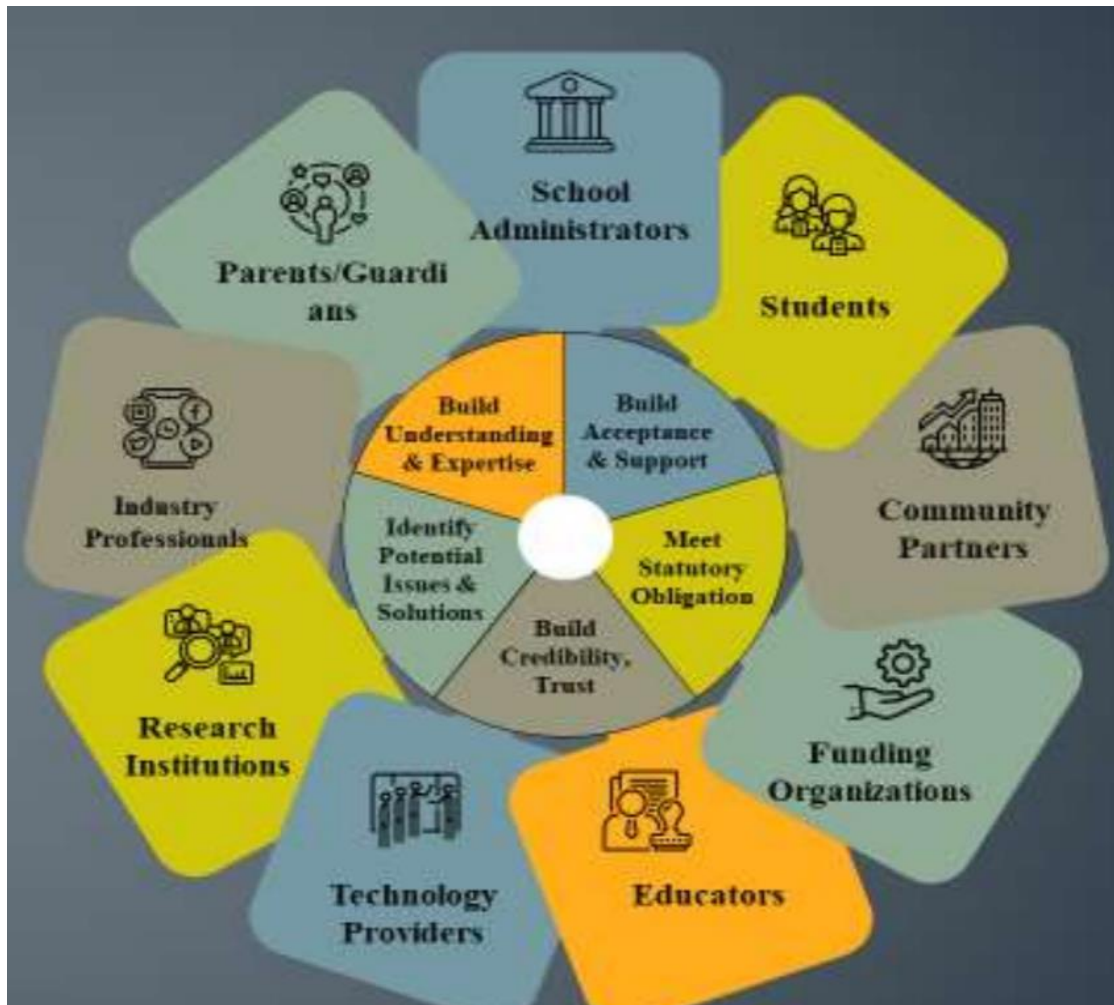
We can now start coming up with ideas. Because of the strong foundation of information from the first two steps, we'll be able to "think outside the box," consider other angles, and come up with creative solutions for the issue statement you've constructed. Here, brainstorming is really helpful.

Prototype

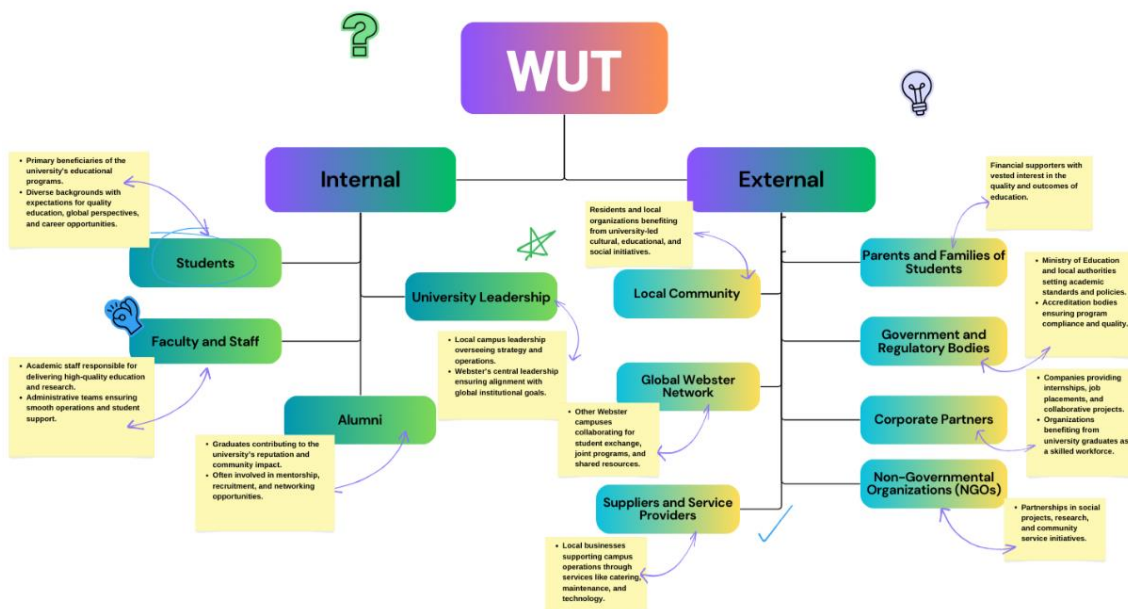
This stage is experimental. Finding the best answer available for each issue is the goal. To explore the concepts we've come up with, team members should create some low-cost, scaled-down copies of the product (or certain functionality included within the product). This might just require paper prototyping.









Stakeholder Maps

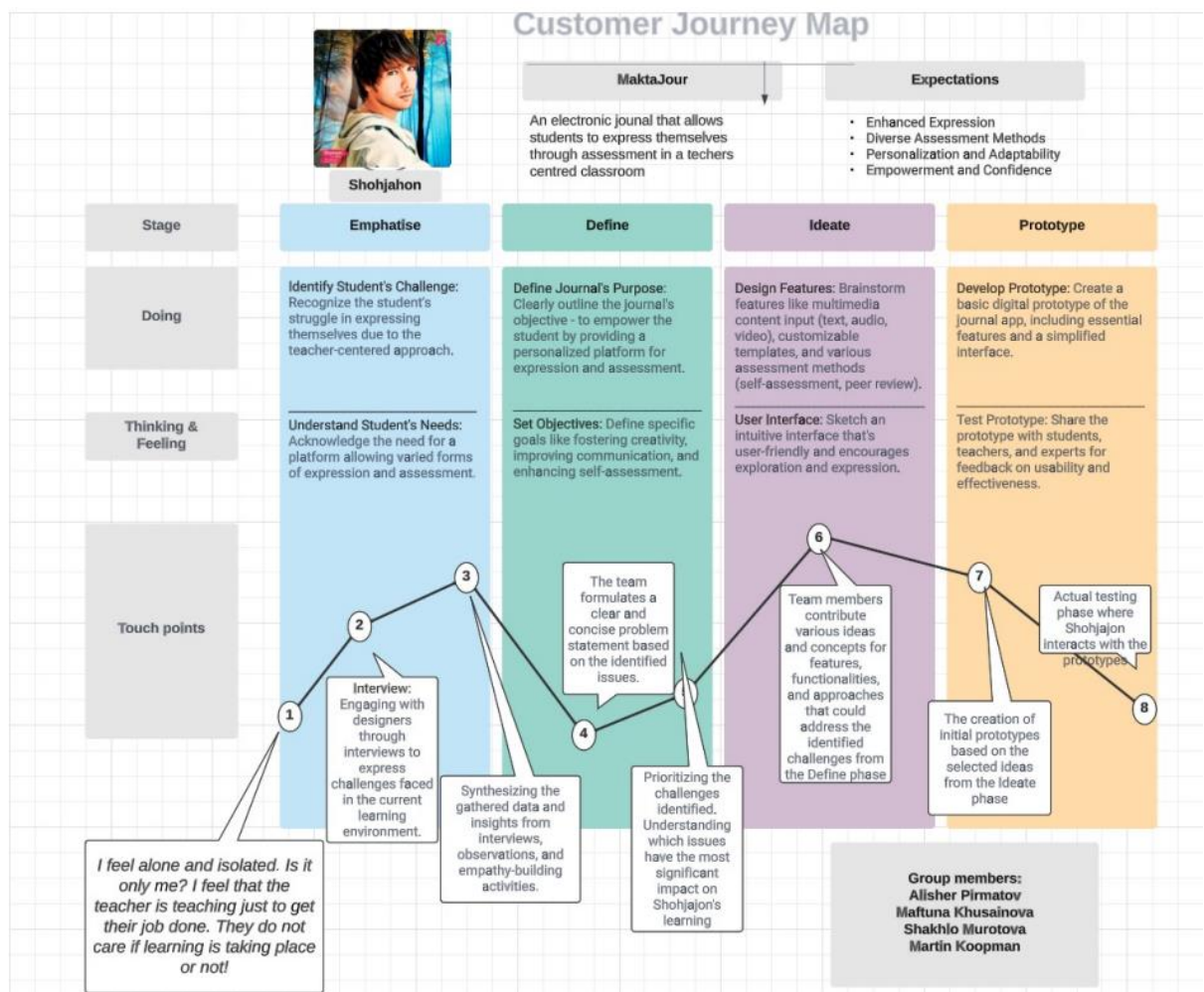


The Stakeholders of Webster University in Tashkent

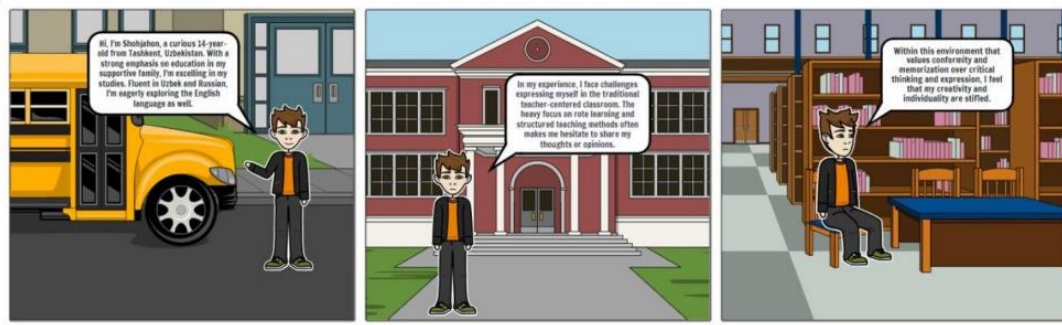


Customer Journey Maps

Persona: Tim Occupation: 9th grader in public school Point of view statement (POV): Tim needs a new innovative website because he needs new, convenient and modern ways of learning.					
STAGE	AWARENESS	CONSIDERATION	DECISION	SERVICE	COMPLETION AND LOYALTY
CUSTOMAR ACTIONS	Tim finds out about the new educational website through online ads, acquaintances, and word of mouth.	Tim visits the website, learns the learning outcomes of the subjects he likes from the subject category, learns the information of online tutors, reads the reviews of the course by other students	Tim selects and enrolls in courses appropriate to his time and circumstances	Tim selects and enrolls in courses appropriate to his time and circumstances	Tim successfully completes his courses, recommends the website to his peers who struggle with traditional education, leaves positive reviews on the website, and also enrolls in other courses on the website.
TOUCHPOINTS	online ads, posts on social webs, word-of-mouth	Webpage, Course options, Course information and descriptions, Reviews, Payment details, Comparing with other learning websites	Course choice Enrollment procedure Creating Login and Account	Chat, email, phone	Online groups or web communities, agile or instant messaging platforms
EMOTIONS	I was bored usual 	We start working on  us 	Realizing  what to do	We are ready for  you	Great future  waiting for you



Storyboards



It was the second week of 10th grade at school for Aziz. However, his expectations for this year's curriculum have already been crushed.



Open your books on page number 39. Write down the summary of the topic.

Stop making noise immediately! Do what you were told!



Again? Isn't the school supposed to prepare us for the real world without focusing on grades?

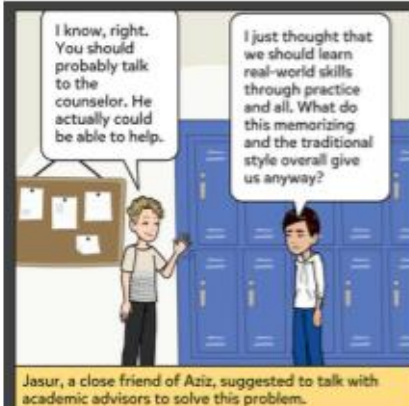
Aziz waited that things would change in 10th grade and he would have more practical learning and creative tasks to do.



Hey Aziz! How are you?

Oh... right. Haven't you got used to it already? This is how the school system works.

Fine.. just as usual, you know - boring classes, everyone concentrated on their grades.



I know, right. You should probably talk to the counselor. He actually could be able to help.

I just thought that we should learn real-world skills through practice and all. What do this memorizing and the traditional style overall give us anyway?

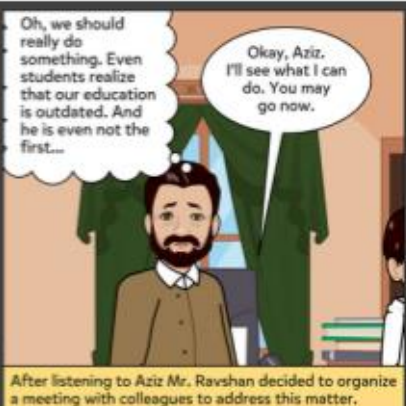
Jasur, a close friend of Aziz, suggested to talk with academic advisors to solve this problem.



So, Aziz how is your studies going?

If I'm being honest sir, I have a problem. All we are doing is just focusing on grades and tests. How is this education appropriate for modern world?

After listening to Aziz Mr. Ravshan decided to organize a meeting with colleagues to address this matter.



Oh, we should really do something. Even students realize that our education is outdated. And he is even not the first...

Okay, Aziz. I'll see what I can do. You may go now.

After listening to Aziz Mr. Ravshan decided to organize a meeting with colleagues to address this matter.



Honestly, I have also been thinking about it lately. Certainly, we can't change a lot but we can create at least some opportunities to learn individually.

I say we do not need to change anything. It's nonsense! Traditional system has been working for so many years.

Mr. Ravshan told about students' concerns when everyone gathered together.



That's a great idea. Our IT teachers can help with that. The learning material will be uploaded by teachers.

It is technological era now. How about designing a website or a mobile application?

What do you mean?

So the school staff agreed on creating a mobile application for students. They thought that individual learning through technology might spark the interest in students for school subjects.



The app is called Edusphere. Let's make it interactive and engaging for all students!

We can include mini-games for subjects like math and science!

Good idea! We'll definitely use it!

It was decided to turn one classroom into a workshop where teachers, students and IT staff worked



This feature lets us chat with teachers in real-time is amazing!

Finally, something that makes learning fun and practical.

After some time when the app was ready, group of

The app became huge success as it catered to the needs of both students and teachers. Learning now was more interactive, personalized and accessible.



Mia is a 15-year-old high school student with a curious mind. She's intelligent but not in the traditional sense-her strengths lie in her passion for dancing.

It is also challenging for her to make friends and work in teams since she rarely finds someone who has the same interests as her.



Mia discovered an app called 'Passion Room' through her friend, Angela.

As soon as she got home, Mia signed up for the dance club.



With excitement, Mia arrived at the place for her first lesson.

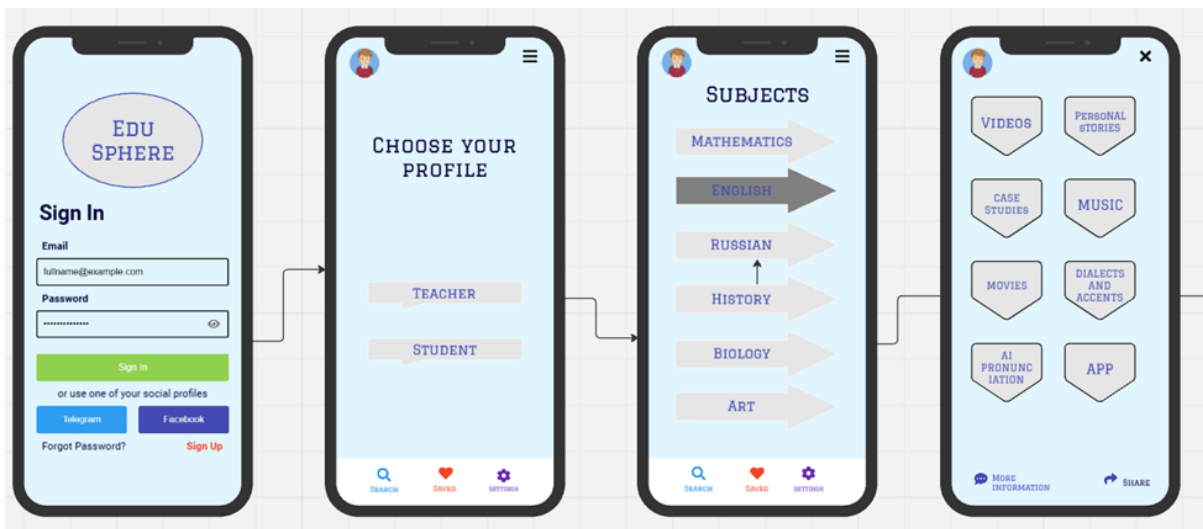
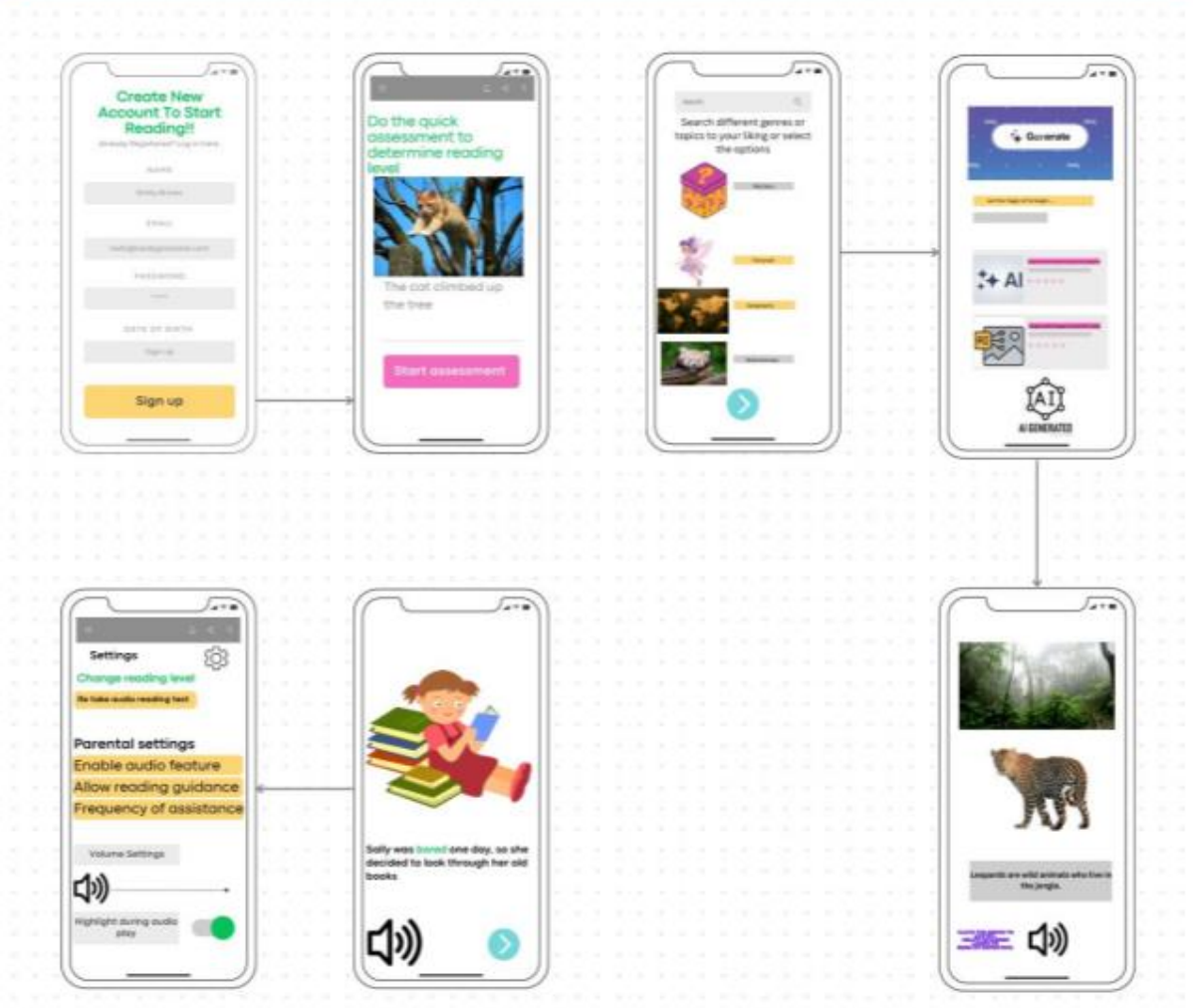
Through the influence of her favorite activity, Mia has become more engaged in class and has shown significant improvement.

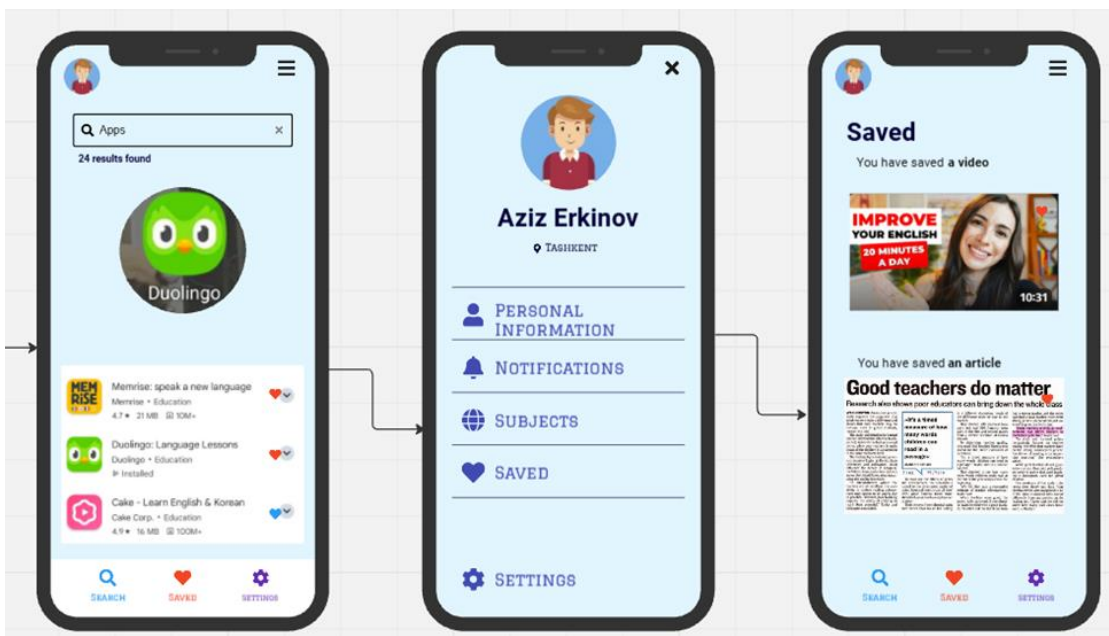
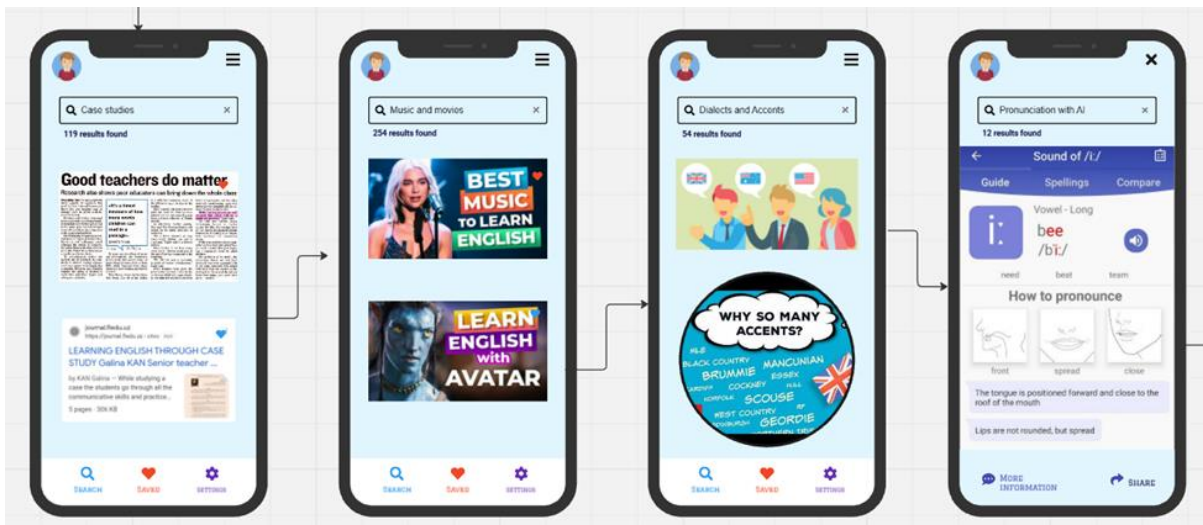
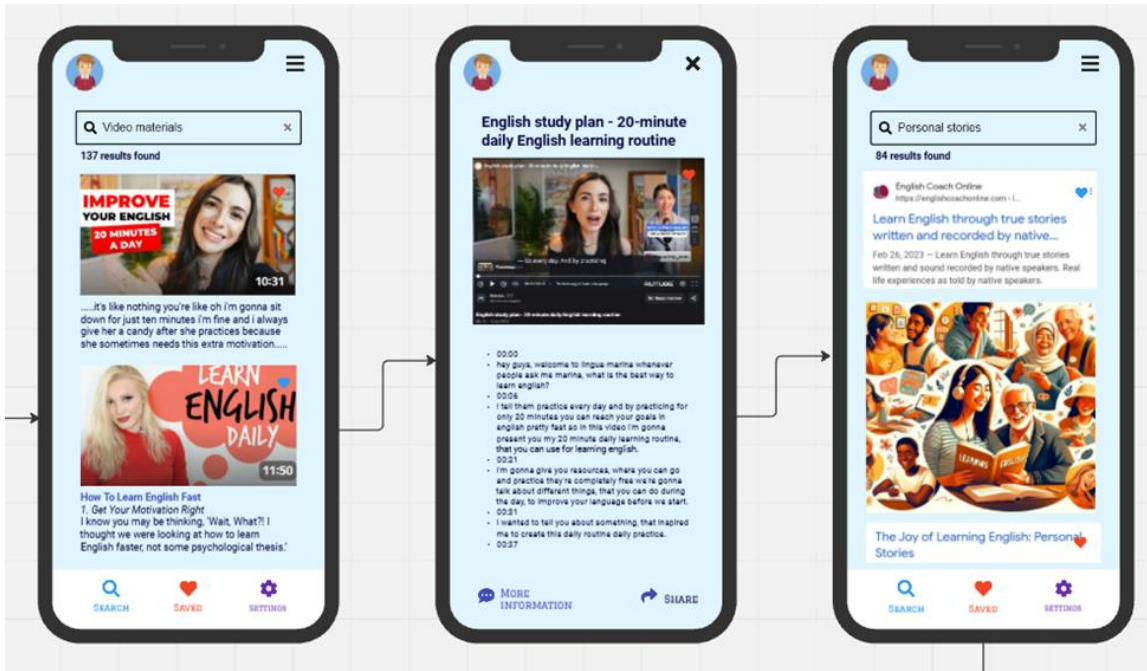


After three months.

Thanks to the Passion Room app, now Mia can enjoy her life, dancing and making her parents proud!

Wire Frame





Wireframe

