

## Soft skills development in future foreign language teachers: evidence from digital educational artifacts

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### ABSTRACT

In the context of digital transformation in teacher education, the development of soft skills among future foreign language teachers has become an important dimension of professional preparation. This qualitative case study aimed to identify the factors shaping soft skills development through the analysis of digital educational artifacts created in a technology-enhanced learning environment. The study involved 48 undergraduate students enrolled in a foreign language teacher education program during one academic semester. The data corpus included reflective essays, discussion posts, collaborative project outputs, multimedia assignments, and digital portfolios produced within a learning management system (LMS)-based course. Content analysis and thematic coding were used to identify recurring patterns in the artifacts. The findings revealed five interrelated groups of factors influencing soft skills development: pedagogical design and teaching methods, pedagogical strategies and learning activities, communication and collaboration in digital environments, organization and management of learning activities, and professional and personal development. The results show that digital educational artifacts provide rich evidence of authentic soft skills manifestation beyond traditional self-report methods. The proposed five-factor model may serve as a practical framework for teacher educators and curriculum designers in digitally mediated teacher education.

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## 1. INTRODUCTION

In the world practice of higher education, increasing attention is being paid to the quality of graduate training, which is considered not only from the perspective of mastering subject knowledge, but also from the point of view of the formation of universal competencies, including soft skills, providing professional mobility, communicative effectiveness and the ability to adapt in a rapidly changing educational environment [1]–[4]. In the system of training future teachers of foreign languages, the development of soft skills is of particular importance, since their professional activities are directly related to pedagogical interaction, intercultural communication and the organization of the educational process [5], [6]. In this regard, higher education institutions face the task of updating educational processes and assessment tools aimed at supporting and monitoring the formation of these skills [7], [8]. The digital transformation of education, which accelerated significantly during the COVID-19 pandemic, had a significant impact on the organization of the educational process and the quality of teacher training. The forced transition from full-

time education to distance learning and mixed formats revealed both new opportunities and existing limitations related to the level of technological equipment and pedagogical readiness of educational organizations [9], [10]. Even before the pandemic, many universities faced a shortage of digital infrastructure and methodological approaches to the use of educational technologies. In these conditions, the integration of learning management system (LMS)-based course design is becoming a strategic direction for the development of training programs for future teachers of foreign languages [11].

The formation of soft skills in the digital educational environment is determined by a set of interrelated factors, including the design of the educational process, the pedagogical strategies used, the nature of communication and the level of student involvement in collaborative and reflexive activities [12]. Technologically enriched educational environments create conditions for the development of communicative, collaborative, critical and regulatory skills, which are key to the professional development of future foreign language teachers [13]. However, traditional assessment methods based primarily on standardized questionnaires with closed-ended questions do not always adequately reflect the complexity and contextual conditionality of the formation of soft skills [14]. In this regard, the analysis of digital educational artifacts created by students in the learning process is of particular research value. Such artifacts include reflective texts, online discussion materials, project results, multimedia assignments, and electronic portfolios that reflect the real manifestations of students' professional and personal qualities [15]. A qualitative analysis of these artifacts makes it possible to identify pedagogical and technological factors that influence the formation of soft skills and gain a deeper understanding of the mechanisms of their development compared to using exclusively quantitative assessment tools [16].

In a digital educational environment, communication and collaboration are increasingly implemented through online platforms and tools that support synchronous and asynchronous interaction. Such forms of interaction contribute to a constant exchange of opinions, the development of reflective thinking and the formation of the professional identity of future teachers of foreign languages [17]. Digital artifacts created in the course of learning activities reflect not only cognitive learning outcomes, but also social, emotional, and professional-personal aspects of student development [18]. Despite the growing body of research on soft skills development and digital learning environments, most studies rely on self-report surveys or standardized assessment instruments that measure perceived competencies rather than their authentic manifestation in learning processes. There remains a limited number of empirical studies that systematically analyze digital educational artifacts as primary data sources for identifying contextual and pedagogical factors influencing soft skills formation in teacher education. The novelty of this study lies in its artifact-based qualitative approach, which shifts the focus from declarative measurement of competencies to the analysis of real educational products created by students. By examining digital traces of learning activities within a case study design, this research provides an integrative model of interrelated pedagogical, technological, and personal factors shaping soft skills development in future foreign language teachers.

In light of the identified research gap and the limited number of artifact-based empirical studies in teacher education, this study aims to identify and systematize the factors influencing soft skills development among future foreign language teachers through the analysis of digital educational artifacts within an LMS-based course design. The study adopts a qualitative case study approach within a non-experimental, cross-sectional framework to explore contextual mechanisms shaping soft skills formation in a digitally mediated environment. To provide a structured analytical focus and ensure conceptual clarity, the research was guided by the following questions:

- What pedagogical, technological, and personal factors influencing soft skills development can be identified through the analysis of digital educational artifacts created by future foreign language teachers?
- How are these factors manifested in students' digital products within an LMS-based course design?
- How can the identified factors be systematized into an integrative model reflecting the structure of soft skills formation in a digitally mediated teacher education environment?

## 2. LITERATURE REVIEW

In scientific research devoted to the development of soft skills in the system of higher pedagogical education, special attention is paid to the role of digital and LMS-based course design as a means of forming universal competencies. Several authors emphasize that the digital educational environment promotes the development of students' communicative, collaborative and reflective skills by expanding opportunities for interaction, autonomy and active participation in the learning process [19]–[21]. In the context of training future foreign language teachers, research shows that the use of digital platforms and online tools allows creating conditions for the formation of professionally significant soft skills, including skills of pedagogical communication, cooperation, self-organization and critical thinking. Thus, Kuzmina [22] describes the experience of using digital communication tools in the educational process and notes that students highly

appreciate the speed of information exchange and the ability to freely express their own opinions, which has a positive effect on the development of communicative and socio-personal skills.

During the period of active introduction of distance and mixed forms of education caused by the COVID-19 pandemic, interest in the analysis of digital traces of students' learning activities has significantly increased. Timotheou *et al.* [23] consider the impact of digital communication tools on teaching activities and emphasize their potential to support interaction between teachers and students. Similar conclusions presented by Gopinathan *et al.* [24], which revealed the positive impact of digital educational environments on student engagement and the development of collaboration skills. Medvedeva *et al.* [25] demonstrate that the analysis of digital forms of interaction makes it possible to identify not only the level of satisfaction of students with the educational process, but also the peculiarities of the formation of their communicative and reflexive skills. Wekerle *et al.* [26] emphasize the importance of digital channels of interaction for accompanying learning activities and individual support of students, which contributes to the development of their independence and responsibility for learning outcomes. A number of works note that digital educational tools act not only as a means of communication, but also as an element of the teacher's didactic strategy. Kim [27] stated that the active use of digital technologies in the educational process enhances pedagogical interaction and creates conditions for the formation of soft skills through joint activities and the exchange of experience. Study by Salas-Pilco *et al.* [28] identify factors affecting the quality of online education, among which pedagogical design, the nature of learning assignments, and the level of student engagement play a key role.

Of particular interest are studies in which digital educational artifacts are considered as a source of empirical data for the analysis of learning processes and professional development. Perry *et al.* [29] show that students prefer to express their opinions and reflective judgments in digital form, as it provides greater freedom and spontaneity of communication. Li *et al.* [30] emphasize that the analysis of digital educational artifacts makes it possible to identify a set of factors influencing the formation of universal skills, including the features of pedagogical interaction, the nature of tasks and the educational technologies used. The analysis of scientific publications shows that digital educational artifacts are a valuable source of data for studying the formation of soft skills in the system of training future teachers of foreign languages. At the same time, despite the availability of research on the use of digital technologies and the development of universal competencies, the issue of identifying specific factors in the formation of soft skills based on a comprehensive analysis of digital educational artifacts in the framework of case studies remains insufficiently studied, which determines the relevance of this work.

### 3. METHOD

#### 3.1. Focus, level, and design of the study

This study employed a qualitative case study design to explore the factors influencing soft skills development among future foreign language teachers through the analysis of digital educational artifacts created in an LMS-based course. A qualitative approach is appropriate when the aim is to examine context-dependent educational phenomena in depth and to interpret meanings embedded in participants' learning products and experiences. The study was exploratory in nature because it sought to identify and systematize factors shaping soft skills development in a specific educational context rather than to test predetermined hypotheses. The research was also non-experimental and cross-sectional, as the data were collected within one academic semester after participants had completed the course activities. The case study design was selected because it allows for an in-depth investigation of a bounded educational setting and provides a holistic understanding of pedagogical processes and learner development within a real-life context. Methodologically, the study was informed by established principles of qualitative case study inquiry [31], purposive sampling [32], and thematic analysis [33].

#### 3.2. Participants and sampling procedure

The study involved 48 undergraduate students enrolled in a foreign language teacher education program at a higher education institution in Kazakhstan. The participants were selected based on purposeful sampling, which is commonly used in qualitative research to ensure information-rich cases relevant to the research objectives. The inclusion criteria were: i) enrollment in the foreign language teacher education program; ii) active participation in the LMS-based course during the semester; iii) completion of key digital educational artifacts, including reflective essays, discussion posts, and project assignments; and iv) consent to participate in the study and allow the use of their learning artifacts for research purposes.

The sample size ( $n=48$ ) was considered appropriate for qualitative case study research, as it provided a sufficiently rich and diverse dataset of digital artifacts while allowing for in-depth analysis. In qualitative research, the emphasis is placed on data saturation and analytical depth rather than statistical representativeness [34]. The collected corpus included multiple artifacts per participant, resulting in a

comprehensive dataset for thematic analysis. The sampling strategy can be characterized as criterion-based purposeful sampling, as participants were selected according to predefined criteria aligned with the research objectives. This approach ensured the relevance and consistency of the data collected within the context of the LMS-based course design. The adequacy of the sample was determined by the principles of information richness and data saturation commonly used in qualitative research. Data saturation was considered achieved when the continued analysis of additional digital artifacts no longer generated substantially new codes, categories, or thematic dimensions related to soft skills development. Because each participant contributed multiple digital artifacts, the dataset was sufficiently rich to support in-depth interpretation and repeated comparison across cases. Thus, the sample of 48 students provided both breadth and depth for identifying recurring patterns and building a stable thematic model.

### 3.3. Data processing and analysis

The data analysis procedure consisted of several systematic stages. First, the researchers collected digital educational artifacts produced by the participants during the semester, including reflective essays, online discussion posts, collaborative project outputs, multimedia assignments, and digital portfolio materials. Each participant contributed more than one artifact, which resulted in a rich corpus for qualitative analysis. Second, all materials were prepared for analysis through data cleaning, anonymization, formatting, and organization into a unified textual database. The corpus was then imported into ATLAS.ti 23 for qualitative data management and coding. The use of software supported the systematic organization of textual segments, code assignment, memo writing, retrieval of coded excerpts, and comparison across artifact types.

Third, the coding process was conducted in several iterative phases. At the initial stage, open coding was applied to identify meaningful units related to the manifestation and formation of soft skills in the digital artifacts. These units included expressions of self-regulation, collaboration, reflection, communication, responsibility, initiative, and professional awareness. At the second stage, similar codes were compared, merged, and refined into broader conceptual categories through constant comparison. At the third stage, the refined categories were grouped into higher-order thematic clusters reflecting pedagogical, technological, organizational, and personal dimensions of soft skills development. This step resulted in the identification of five interrelated categories: pedagogical design and teaching methods; pedagogical strategies and learning activities; communication and collaboration; organization and management of learning activities; and professional and personal development. To enhance analytical transparency, coding was conducted iteratively rather than in a single round. The researchers repeatedly returned to the data, revised code definitions, and discussed category boundaries until conceptual agreement was reached. Analytic memos were used throughout the process to document coding decisions, emerging interpretations, and links between categories. Although the study remained qualitative in orientation, the frequency of coded units was also examined to increase analytical clarity and to indicate the relative prominence of themes across the dataset. On this basis, an integrative model of factors influencing soft skills development was constructed.

As a result of the content analysis of digital educational artifacts created by future foreign language teachers, five interrelated categories of factors influencing soft skills development were identified. These categories include pedagogical design and teaching methods, pedagogical strategies and learning activities, communication and collaboration, organization and management of learning activities, and professional and personal development. Figure 1 presents the integrative conceptual model derived from the qualitative coding process and shows how these five groups of factors are structurally related within the digitally mediated teacher education environment.

### 3.4. Validity and reliability

To ensure trustworthiness, the study followed the criteria of credibility, transferability, dependability, and confirmability. Credibility was strengthened through prolonged engagement with the artifact corpus, repeated reading, iterative coding, and peer debriefing among the researchers. Transferability was supported by a detailed description of the educational context, participant characteristics, and the nature of the digital artifacts. Dependability was enhanced through a transparent documentation of analytical procedures, including data preparation, code development, category refinement, and model construction. Confirmability was supported through reflexive memoing, preservation of original artifacts, and grounding interpretations in coded excerpts rather than in unsupported assumptions.

## 4. RESULTS AND DISCUSSION

As a result of the content analysis of digital educational artifacts created by future foreign language teachers (reflective texts, online discussion materials, project work, and multimedia products), key factors influencing the formation of soft skills in the context of LMS-based course design have been identified. The generalized structure of the factors is shown in Figure 1, while the quantitative ratios within each

category are detailed in Figures 2–6. The first group of factors was classified as “pedagogical design and teaching methods”, reflected in the factor model. These factors are related to the formation of students’ goal-setting skills, self-regulation, and responsibility for learning outcomes. In digital educational artifacts, they manifested themselves through the structuring of educational goals, planning the stages of completing assignments, and meeting deadlines. The quantitative distribution of factors in this category is shown in Figure 2, where it can be seen that the greatest contribution to the formation of soft skills is made by factors related to goal setting and informed planning of educational activities. This confirms the research findings that clear pedagogical design is a basic condition for the development of universal competencies among future teachers.

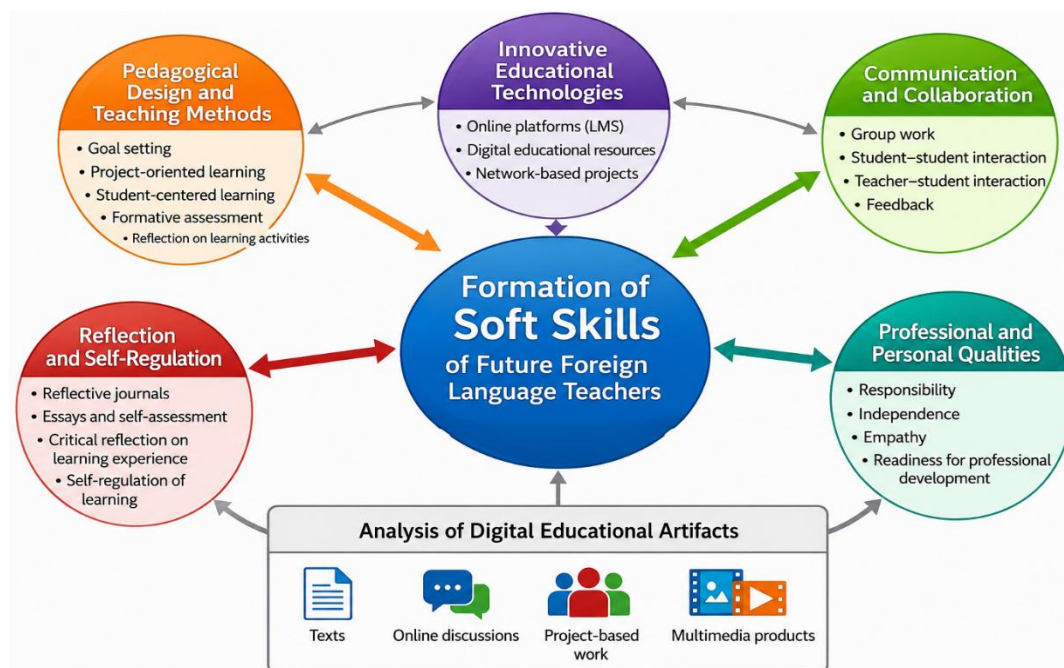


Figure 1. Factors influencing the formation of soft skills of future foreign language teachers based on the analysis of digital educational artifacts

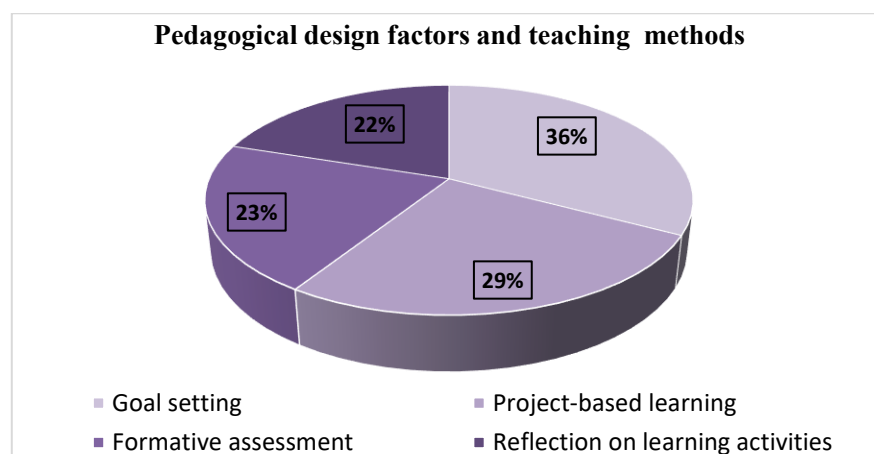


Figure 2. Percentage distribution of pedagogical design factors and teaching methods

The second group of factors was classified as “pedagogical strategies”. This category includes project-based learning, research assignments, group work, and formative feedback. In digital educational artifacts, these factors manifested themselves through the active participation of students in joint projects, argumentation of decisions and initiative in discussions. As shown in Figure 3, research and project

assignments have the highest frequency in this category, indicating their leading role in the development of critical thinking, creativity, and decision-making. These results are consistent with current research in the field of competence-based learning.

The third group of factors belongs to the category of “communication and collaboration”, presented in the factor model as one of the key mechanisms for the formation of soft skills. The analysis of digital educational artifacts has shown that these factors are manifested in the ability of students to express their own position in a reasoned manner, interact in groups and provide constructive feedback. The percentage distribution of factors in this category is shown in Figure 4, where forms of interaction related to group discussions and student–student communication prevail. This confirms that collaborative forms of work in the digital environment are a significant factor in the development of communicative and socio-emotional soft skills among future foreign language teachers.

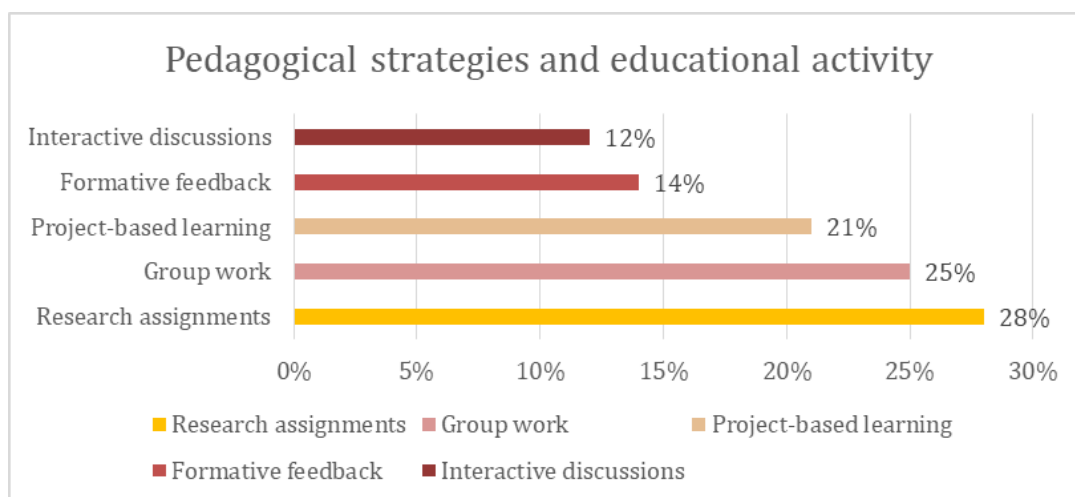


Figure 3. Percentage distribution of factors of pedagogical strategies and educational activity

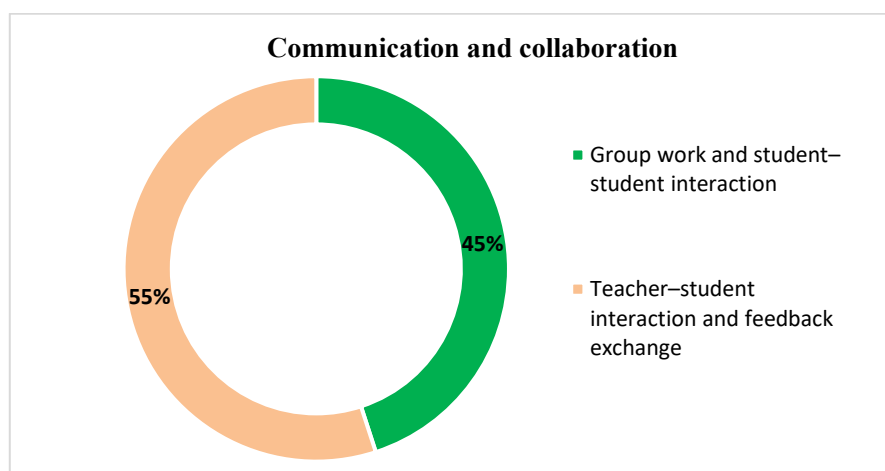


Figure 4. Percentage distribution of communication and collaboration factors

The fourth group of factors was classified as “organization and management of educational activities”. These factors reflect the formation of self-discipline, time management, and learning orientation skills. In digital educational artifacts, they manifested themselves through the logical structure of the presentation of materials and the sequence of tasks. As shown in Figure 5, the most significant factor in this category is compliance with the logic and integrity of educational activities, which contributes to the formation of professional organization and responsibility. This is especially important in the context of digital learning, where the degree of independence of students is increasing.

The fifth group of factors belongs to the category of “professional and personal qualities”, which in the factor model reflects the final level of soft skills formation. In digital educational artifacts, these factors manifested themselves through reflexive statements about professional identity, demonstration of empathy, responsibility and readiness for professional development. The percentage distribution of factors in this category is shown in Figure 6, where the leading factors are readiness for professional development and a conscious attitude towards future teaching activities. This highlights the importance of professional reflection as a key mechanism for the formation of soft skills. The combined analysis of the results presented in Figures 2–6 allowed us to form a holistic model of the factors of formation of soft skills of future foreign language teachers, presented in Figure 1. The model demonstrates that the formation of soft skills is multifactorial, and individual factors functionally overlap between different categories.

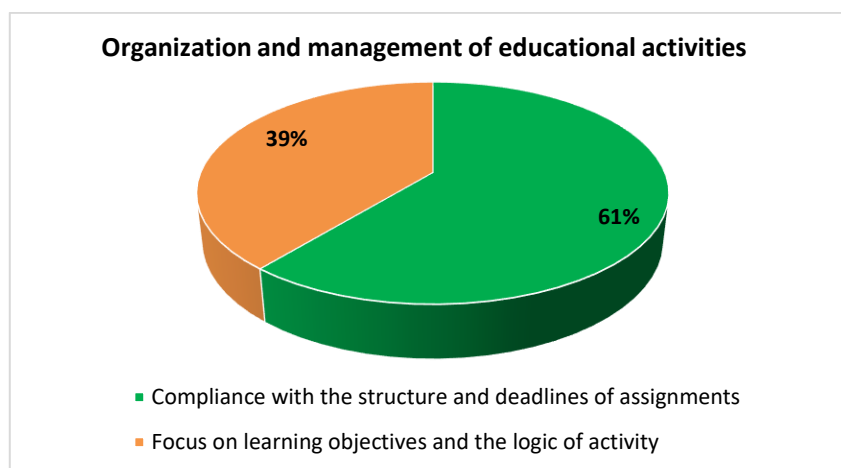


Figure 5. Percentage distribution of factors of organization and management of educational activities

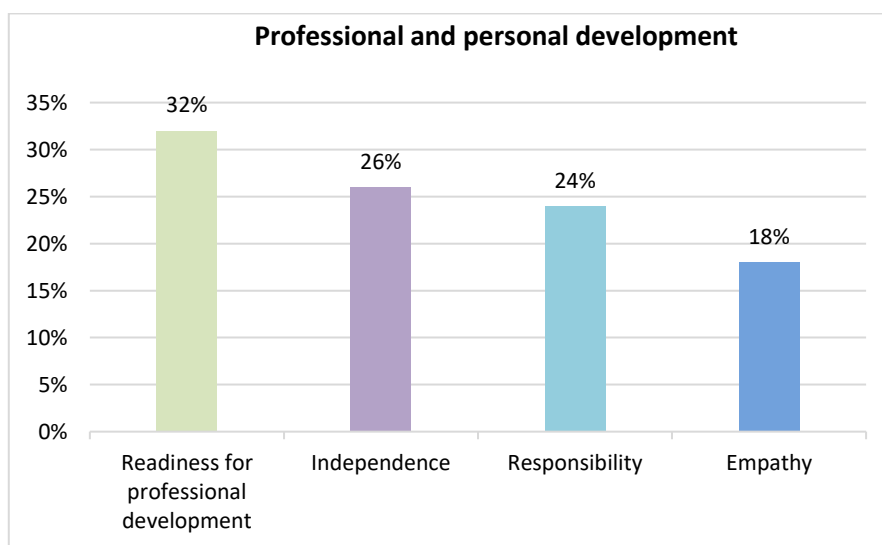


Figure 6. Percentage distribution of professional and personal development factors

#### 4.1. Discussion in the context of previous research

The findings of this study not only confirm existing research on digitally mediated learning environments but also provide a deeper analytical interpretation of the mechanisms through which soft skills are developed and manifested in practice. A key contribution of this study lies in clarifying the relationship between digital educational artifacts and soft skills development. The analysis demonstrates that digital artifacts do not merely reflect learning outcomes but function as evidence-based representations of students' competencies, capturing the process of their formation in real time. Reflective texts revealed the development

of metacognitive and self-regulatory skills, while discussion posts and collaborative project outputs provided insight into communicative competence, argumentation, and teamwork. This finding extends previous research by showing that soft skills are not only developed through interaction but are also materialized and observable in students' digital products. The prominence of pedagogical design factors identified in this study supports the conclusions of Salas-Pilco *et al.* [28] who emphasize the role of structured instructional design in enhancing engagement and competency development. However, the present study goes further by demonstrating how pedagogical design is translated into observable patterns within digital artifacts, thereby linking instructional structure with tangible manifestations of student competencies. Similarly, the importance of collaborative learning activities corresponds with the findings of Gopinathan *et al.* [24] who highlight digital collaboration as a key driver of student participation. In contrast to prior studies relying on self-reported engagement, this research provides artifact-based evidence of collaboration, including interaction patterns, feedback exchanges, and collective problem-solving processes embedded in digital learning products.

The high frequency of project-based and research-oriented tasks as drivers of critical thinking and creativity aligns with Tang [19], but this study refines these findings by demonstrating how such skills are explicitly reflected in the structure, content, and argumentation patterns of student-generated artifacts. From a pedagogical perspective, the results highlight that effective soft skills development in digitally mediated environments requires a deliberate alignment between instructional design, task structure, and opportunities for reflection and collaboration. Teacher educators should therefore not only integrate digital tools into the learning process but also design tasks that produce meaningful artifacts capable of revealing and supporting competency development. The study also has several limitations that should be considered when interpreting the results. First, the research was conducted within a single educational program and a relatively limited sample, which may affect the generalizability of the findings. Second, the qualitative design, while providing rich contextual insights, does not allow for statistical generalization. Third, the analysis focused on a specific set of digital artifacts within one LMS-based environment, which may not fully capture the diversity of digital learning contexts.

Future research may address these limitations by applying mixed-method approaches, expanding the sample across multiple institutions, and conducting longitudinal studies to examine the development of soft skills over time. Additionally, further validation of the proposed five-factor model using quantitative methods would strengthen its applicability and generalizability. Overall, this study advances the understanding of soft skills development by demonstrating that digital educational artifacts serve not only as learning products but also as analytical lenses through which the dynamics of competency formation can be systematically examined.

#### 4.2. Theoretical contribution

This study makes a novel and theoretically grounded contribution to the literature on teacher education and soft skills development in digitally mediated learning environments. First, the study extends competency-based and soft skills development theories [4], [7] by introducing an artifact-oriented conceptualization of soft skills. Unlike traditional approaches that treat soft skills as latent constructs measured through self-report instruments, this research conceptualizes soft skills as observable, situated, and materialized in digital educational artifacts. This represents a shift from perception-based assessment to evidence-based theoretical representation of competencies.

Second, the study refines constructivist and socio-cultural learning theories by demonstrating that learning outcomes are not only socially constructed through interaction but are also externalized and stabilized in digital learning products. The findings suggest that digital artifacts function as mediating objects that connect internal cognitive processes with externally observable manifestations of competence, thereby deepening the theoretical understanding of how soft skills are formed and expressed in digital environments. Third, the study integrates multiple theoretical perspectives, including competency-based education, digital pedagogy, and reflective learning theory, into a coherent and empirically grounded five-factor model of soft skills development. This integrative model advances existing frameworks by explicitly linking pedagogical design, learning strategies, interaction patterns, organizational processes, and identity development within a single conceptual structure.

Fourth, the study challenges the dominance of self-report-based assessment paradigms by providing empirical and theoretical justification for using digital educational artifacts as valid indicators of authentic competency development. This contribution addresses a critical gap in the literature by bridging the divide between declared competencies and their actual manifestation in learning practice. Overall, this research contributes to theory by reframing soft skills as dynamic, context-dependent, and artifact-mediated constructs, thereby offering a novel conceptual lens for understanding competency formation in digitally mediated teacher education.



## 5. CONCLUSION

In accordance with the aim of the study, it was found that these factors can be systematized into five interrelated groups: pedagogical design and teaching methods, pedagogical strategies and learning activity, communication and collaboration, organization and management of educational activities, professional and personal qualities. The results confirm the multifactorial and complex nature of the soft skills formation process in the context of the use of LMS-based course design. An analysis of digital educational artifacts, including reflective texts, online discussions, project work, and multimedia products - has shown that this approach makes it possible to identify real manifestations of students' universal competencies that cannot always be captured using traditional assessment tools based primarily on standardized questionnaires with closed-ended questions. Unlike formalized measurement methods, the analysis of digital artifacts provides a deeper and contextually determined understanding of the processes of soft skills formation, which are significant both from the perspective of educational programs and from the point of view of the professional development of students themselves.

The results of the case study indicate that the use of digital educational artifacts as a source of empirical data helps to reduce the gap between formally declared learning outcomes and the soft skills actually formed by future foreign language teachers. This is especially relevant in the context of digitalization and transformation of teacher education, when the role of autonomous learning, reflection and professional self-development is increasing. The study was conducted on a limited sample of students within the framework of one educational program, which determines its methodological limitations. In this regard, the prospects for further research are related to the expansion of the sample, the inclusion of students in various fields of pedagogical training, as well as the use of mixed methods of analysis combining qualitative and quantitative approaches. The results can be used in the design and improvement of educational programs for the training of future teachers of foreign languages, as well as in the development of tools for assessing the formation of soft skills in a technology-oriented educational environment.

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This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

## CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest

## INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

## ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee.

## DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, [AB], upon reasonable request.

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