Knowledge Management in Distance Education: Challenges Related to Learning Motivation

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Abstract: This article addresses the challenges of knowledge management in distance education at higher education institutions. Remote teaching has necessitated changes in knowledge delivery methods. Closely linked to the new digitalized environment, online teaching has transitioned to a new educational paradigm. The article presents research findings on the challenges of maintaining motivation in distance learning and examines whether there is a relationship between motivation and factors such as gender and study level. The aim is to identify the challenges faced by students and provide recommendations to effectively support student engagement and assist them in the learning process. The first part outlines the theoretical foundations of distance education. The subsequent section explores the challenges students encounter during independent distance learning. A social research method using a questionnaire (CAWI) was employed. Respondents included full-time and part-time undergraduate (bachelor's/engineering) and graduate (master's) students. The study was conducted between July and December 2024, with 230 students participating. The results concerning the analyzed variables are presented and discussed.

Keywords: Education, Knowledge, Learning environment, Higher Education, Motivation

1. Introduction

The rapid implementation of modern technologies compels society to continually update and expand knowledge across various fields of science and technology. In a world of constant change and advancing technological globalization, the challenges facing education are multifaceted. The contemporary generation of the academic community, especially in technical universities, has increasingly demanding expectations regarding educational materials: they seek dynamic content, digital approaches, and high-quality visuals. The knowledge imparted should be presented in an engaging manner that utilizes the latest technologies. Distance education is not merely a technological issue but fundamentally concerns the organization of the educational process, requiring active engagement from both students and lecturers (Kabus, Samek-Wojtyla, 2024). Maintaining motivation in this model poses significant challenges. While technology facilitates access to educational materials, self-organization, engagement, and participant interaction often require additional support. This is particularly true in online learning environments, where flexibility in format and scheduling exists; here, motivation is crucial for sustaining activity and achieving student outcomes. In this context, knowledge management plays a vital role by aiding in the effective collection, processing, and sharing of information in ways that are engaging and tailored to student needs.

This article aims to address the following research questions:

RQ1: What are the primary challenges associated with maintaining motivation in distance education?

RQ2: Are there correlations between student motivation and their gender and degree of study? Two hypotheses were put forward to verify the question. H1 - motivation for self-directed learning varies significantly across different study levels, H2 - there are significant differences in the level of motivation for self-directed learning depending on gender

RQ3: What recommendations can be made to enhance the distance learning process?

Answering these questions seeks to deepen the understanding of factors influencing student motivation in distance learning and to develop strategies that support the effectiveness of this educational model.

2. Literature Review

Distance education is not a new phenomenon; its origins trace back nearly a century. In the 1920s, "educational radio" was utilized, and from 1945 onwards, "educational television" expanded through initiatives like those at Iowa State University (Kossobucka, 2011). Earlier forms of distance learning involved mailing instructional materials, textbooks, and specialized journals, though these methods lacked interactive engagement between teachers and students. The first correspondence school was established in England in 1840, followed by similar institutions in Berlin in 1856, the United States in 1860, and Poland in 1916. Norway introduced the first legal regulations for distance education in 1914 (Dziewulak, 2020). The 1950s marked a

pivotal shift with the advent and widespread adoption of the Internet, significantly enhancing communication capabilities. This technological advancement eliminated geographical barriers, making distance education more accessible and leading to its rapid expansion.

These changes have fostered a new learning paradigm that views knowledge acquisition as a lifelong process. Educational institutions are increasingly implementing modern courses and training programs that leverage computers and the Internet, seeking innovative solutions to enhance teaching effectiveness. Contemporary educational technologies have transformed participants from passive recipients to active, engaged learners (Piersiala, 2024). The development of Virtual Learning Environments (VLEs) has added significant value to modern teaching methods (Biernacka, Patalas, 2006).

Distance education has become the most technologically advanced form of education today, offering benefits such as cost reduction, accelerated learning processes, easier access to training, and efficient monitoring and assessment of learners. Additionally, e-learning enables educators to enhance educational quality by utilizing rapidly evolving global educational resources (Yahiaoui et.al, 2022).

Organizations characterized as knowledge-based focus on creating value through effective knowledge utilization. According to Grudzewski and Hejduk (2004), a knowledge-based organization is one whose structure is focused on creating added value based on the application of knowledge use. The decision to use a knowledge-based organization primarily concerns the following features:

- they produce Knowledge Rich Products, i.e. those whose value is over 50% knowledge, or they provide common services based more on access to knowledge than on physical work,
- they employ high-class specialists, the so-called Knowledge Workers, who constitute the core of all employees,
- about their values resulting from the high value of the intellectual value that determines it.

Applying this definition, higher education institutions are prime examples of knowledge-based organizations, as they leverage knowledge to gain competitive advantages and assist others in acquiring it (Krawczyk, 2024). To meet evolving demands, universities are becoming more open and flexible.

The prevalence of e-learning in higher education is increasing. Terms such as e-learning, distance education, distance learning, distance teaching, correspondence study, open education, teaching by network, online learning, m-learning, Computer-Aided Learning, Computer-Based Training oraz Web-Based Training and others are used interchangeably to describe this educational modality (Kisielnicki, 2008; Kaźmierska, 2019; Looi, 2021). In the United States, the educational market segment for e-learning is expanding rapidly. For instance, funding for online education grew from $550 million in 1998 to $9.3 billion in 2003. E-learning has become an integral part of university operations not only in the U.S. but also globally (Carr, Chellman 2004). Observing trends in the U.S. and Western Europe, it's anticipated that the demand for e-learning will continue to rise in Poland in the coming years. Ongoing technological advancements provide higher education institutions with opportunities to enhance e-learning experiences, making it a crucial strategy for universities (Adnan andAnwar, 2020; Fadillah et.al., 2020)..

In the case of distance learning, students work without physical, direct contact with the lecturer and other students, and therefore need to be more engaged and motivated to learn. Traditional learning provides opportunities for direct contact, informal relationships, conversations in the hallway, and spending time together. Motivation to learn is considered a key factor for success in distance learning (Akram, Li., 2024; Wei et.al., 2023; Çebi, Güyer, 2020; Koyuncuoglu, 2021). However, evidence suggests that student motivation is not a static characteristic that changes with various factors as the course progresses, including emotional states, economic conditions, personal problems, and course content. In addition, studies have shown that factors such as students' age, gender, cultural background, and socioeconomic status can have a significant impact on learning motivation (Ishida, Sekiyama, 2024; Sigmundsson et.al., 2022; Maghrifani, 2024). For example, students from different cultural or social backgrounds may exhibit different types of motivation in the learning process, which may be related to their educational expectations, values, and personal life experiences (Sigmundsson et.al., 2022). In particular, students from lower socioeconomic status may face greater challenges in learning, which may affect their motivation and learning strategies (Maghrifani, 2024). Therefore, understanding the impact of these factors on learning motivation is crucial for designing more personalized and targeted didactic courses. Motivation has been identified as the most important factor that determines students' choices about what to learn, how to learn, and when to learn (Hartnett, 2016). Motivation is an essential aspect of any educational process, especially in relation to e-learning (Yahiaoui et.al,

2022). For example, Elshareif and Mohamed (2021) analyzed data on student learning during COVID-19 to investigate the relationships between key aspects of e-learning and learning motivation. The study identified key aspects of e-learning (i.e., e-learning materials, e-assessments, e-discussions, etc.) in relation to students' learning motivation. However, this relationship was identified based on the data at the end of the course, which partially shows that the authors took student learning into account. In contrast, in Xu's (2017) study, the author identified behaviors such as coping with distractions, organizing the learning environment, time management, emotional engagement, motivation monitoring, and cognitive reappraisal. Kotarba (2024) also identified a set of challenges and factors that academic e-learning faces, indicating, among others: time management, comprehensibility and curiosity of course content, interactions with the lecturer or student group. In turn, Pei (2025) analyzed the quantification of students' motivation to learn and detect their learning dynamics in virtual learning environments. Several studies have shown that students' motivation has a direct impact on students' performance. Therefore, the literature claims that there is a correlation between these two variables (Richardson et al., 2012; Azizoğlu et al., 2015).

3. Research Methodology

The subjects of this study are students who grew up in the digital age, in a world saturated with technology. Their lifestyle is based on digital solutions, and they are characterized by their ease in navigating educational platforms and various online tools. Their method of acquiring knowledge differs from previous generations, which in turn implies a new approach in academic didactics.

This study was conducted to determine the challenges faced during distance learning and how it affects motivation to study. The research was carried out in the form of a survey, and data were collected using a structured questionnaire distributed among students at all levels (both undergraduate – bachelor's and engineering, as well as graduate – master's). The initial sample consisted of 230 students, with 205 correctly completed questionnaires collected, resulting in a response rate of 89%, which is considered highly acceptable according to Sekaran and Bougie (2019). A purposive sampling method was applied. The questionnaire included questions designed for quantitative analysis. Measurement items were expressed using a five-point Likert scale, defined as follows: 1 = strongly disagree, 2 = disagree, 3 = somewhat agree, 4 = agree, and 5 = strongly agree. The questionnaire encompassed two main constructs, in addition to demographic data, also examining the student's motivation for distance learning. Calculations were performed using SPSS software (version 29).

4. Results

The study involved 205 participants: 96 women and 109 men. The largest group consisted of individuals aged between 20 and 25, while the smallest group comprised those over 35 years old. Respondents' ages were recorded from 17 upwards, as the Częstochowa University of Technology enrolls students from Ukraine who often begin their studies earlier than their Polish counterparts. The demographic breakdown by age and gender is presented in Table 1.

Table 1: Demographic Characteristics of Respondents

Characteristic		Frequency	Percentage
Gender	Women	96	47%
	Men	109	53%
Age	17–20 years	21	10%
	21–25 years	79	39%
	26–30 years	53	26%
	31–35 years	40	20%
	Over 35 years	12	6%
Study Programme	Full-time Bachelor's	5	2%
	Part-time Bachelor's	17	8%
	Full-time Engineering	58	28%
	Part-time Engineering	19	9%
	Master's	106	52%

Initially, digital competencies related to distance learning were assessed. The distribution of responses is shown in Figure 1.

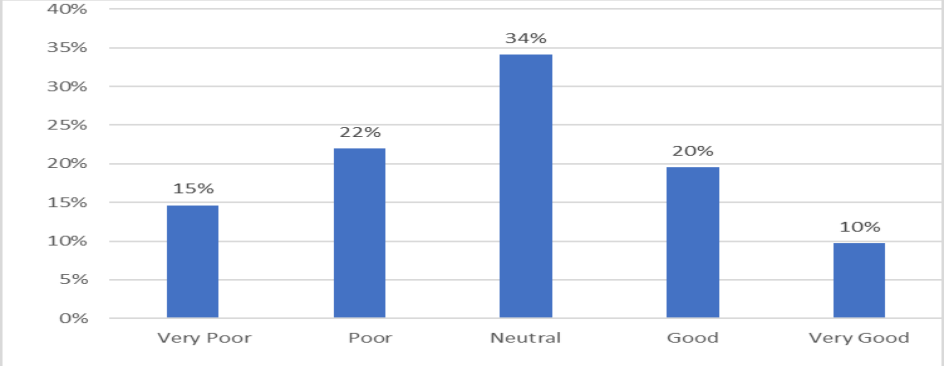

Figure 1: Self-assessment of Digital Competencies for Distance Learning

Description of response categories for the question "How do you assess your digital competencies related to distance learning?" on a scale from "very poor" to "very good":

- Very Poor: The participant feels their digital competencies in the context of distance learning are very low, experiencing difficulties with educational tools, e-learning platforms, online communication, or other related technologies.
- Poor: The participant rates their digital skills as low, managing basic functions but lacking confidence in using advanced features, possibly requiring additional support or training.
- Neutral: The participant is unsure about their digital competencies, possibly due to limited experience with online learning.
- Good: The participant feels competent in using educational tools, e-learning platforms, and managing digital learning materials effectively.
- Very Good: The participant possesses high digital skills, efficiently using advanced features of educational technologies and managing their learning process innovatively.

Subsequently, challenges faced during distance learning were examined using a five-point Likert scale ranging from strongly disagree to strongly agree (RQ1). Table 2 presents the mean scores for various challenges associated with distance learning.

Table 2: Challenges in Distance Learning

Challenge	Mean	Standard Deviation
Motivation for self-directed learning	3,1512	1,35095
Working at one's own place	2,4829	1,41627
Time management	3,1854	1,18188
Technical difficulties	2,9366	1,33610
Limited contact with lecturers	3,1317	1,46100
Maintaining concentration	2,6244	1,40391
Accessibility of educational materials	3,1561	1,43998
Difficulties in assessing progress	3,7317	1,23321
Feeling overwhelmed	2,4341	1,28407
Lack of direct contact with peers	3,5317	1,31925
Difficulty separating study and rest time	1,9805	1,07540

High standard deviation for "limited contact with lecturers" suggests varied experiences among students, while lower variability for "difficulty separating study and rest time" indicates more consistent opinions.

The study also assessed students' motivation for self-directed learning, with responses summarised in Table 3.

Table 3: Motivation for Self-Directed Learning

Response	Frequency	Percentage
Strongly Disagree	32	15,6
Disagree	37	18,0
Neutral	44	21,5
Agree	52	25,4
Strongly Agree	40	19,5
Total	205	100,0

Over one-third of respondents reported difficulties with motivation for self-directed learning, potentially due to lack of support, organizational challenges, or low engagement with online teaching. Nearly a quarter were undecided, suggesting variable motivation influenced by study conditions, course content, or institutional support. Almost half expressed motivation for self-directed learning, indicating that many students adapt well to this teaching mode despite challenges.

The study tested the hypothesis (H1) that motivation for self-directed learning varies significantly across different study levels. ANOVA results (Table 5) showed a significant difference ($p < 0.001$), leading to the rejection of the null hypothesis. This indicates that motivation levels differ among students at various study stages.

Table 5: ANOVA Results for Motivation by Study Level

	Sum of Squares	df	Mean Square	F	Significance
Study Level	35,600	4	8,900	5,286	<,001

The significance value ($p < 0.001$) is much smaller than the standard significance level (0.05), so we reject the null hypothesis. This means that there are statistically significant differences in the level of motivation for self-directed learning between students at different levels of study. The results suggest that motivation for learning is not uniform across different levels of study. According to the cross-table (Table 6), full-time engineering students demonstrated the highest motivation for self-directed learning. Part-time bachelor's students (SN) also showed relatively high motivation. The largest lack of motivation was found among master's students, which may indicate a need for intervention to increase their engagement. Both engineering (ST) and master's students showed the largest group of "undecided" individuals, suggesting that their motivation may be variable and dependent on various factors.

Table 6: Do you have motivation to study?

Motivation	Study Level					Total
	1	2	3	4	5	
Strongly Disagree	4	1	8	2	17	32
Disagree	0	1	6	3	27	37
Neutral	0	3	11	5	25	44
Agree	0	3	19	5	25	52
Strongly Agree	1	9	14	4	12	40
Total	5	17	58	19	106	205

Explanation of table: 1 = Full-time Bachelor's, 2 = Part-time Bachelor's, 3 = Full-time Engineering, 4 = Part-time Engineering, 5 = Master's

In order to answer the research question RQ2: Are there any connections between students' motivation and their gender?, an analysis of variance (ANOVA) was conducted, the results of which are presented in Table 7. The research hypothesis H2, which assumed the existence of significant differences in the level of motivation for independent learning depending on gender, was verified.

Table 7: ANOVA Results for Motivation by Gender

	Sum of Squares	df	Mean Square	F	Significance
Gender	0,115	1	0,115	0,063	0,802

Based on the presented ANOVA analysis results table, there is no statistically significant difference in motivation between genders. Therefore, there is no basis to claim that motivation depends on gender. The p value (0.802) significantly exceeds the assumed level of significance (e.g. $\alpha = 0.05$), which means there is no basis to reject the null hypothesis. Therefore, the existence of a relationship between students' motivation and their gender was not confirmed. Hypothesis H2 was not confirmed by the results of the study.

5. Conclusions

Analysis of the presented data identifies key challenges faced by students during remote learning. Difficulties in assessing progress (3.73) and the lack of direct contact with peers (3.53) are among the most significant issues. This highlights challenges in monitoring personal development and limited opportunities for social interaction, which can negatively impact motivation and self-discipline. The variability in results points to the need for individualized support and improvements in remote teaching methods.

Nearly 45% of students report having motivation for independent study, while a significant group (21.5%) remains undecided, suggesting external factors may influence their motivation, such as the quality of educational materials, teaching methods, and interaction with instructors. Approximately one-third of respondents face challenges in self-motivated learning, indicating a need for additional support, such as better access to educational resources, motivational strategies, and mentoring.

There is a correlation between the type of study program and motivation for independent learning. Full-time engineering students exhibit the highest motivation, while master's students show the most negative responses, potentially due to academic burnout, lack of challenges, or increased external responsibilities. No significant relationship was found between motivation and gender.

To enhance motivation for distance learning, several recommendations can be considered:

- Quality of Educational Materials: Implement interactive resources such as short videos, quizzes, and simulations. Organize online courses with clear structures to facilitate easier comprehension. Offer diverse learning formats, including independent work, group consultations, and practical exercises.
- Extracurricular Support: Conduct workshops on effective study techniques, self-discipline, and motivational strategies. Encourage students to adopt planning methods to manage their studies effectively.
- Enhancing Interactions: Establish regular online meetings with instructors, such as Q&A sessions or individual mentoring. Create virtual study groups to foster peer motivation and support. Introduce gamification elements, like leaderboards and activity-based contests, to increase engagement.
- Assessment Methods: Consider replacing traditional tests with practical projects and problem-solving tasks that actively involve students. Provide clear guidelines on academic progress to help students understand their current standing. Offer constructive feedback to boost student engagement in the learning process.

In summary, while a substantial portion of students are motivated for independent study, many face challenges that require targeted interventions. Improving the quality of educational materials, providing robust support for study management, enhancing interactions with educators and peers, and refining assessment methods are crucial steps toward fostering a more effective and motivating learning environment.

6. Summary

The conducted study has certain limitations. First, it is based on data collected from the Czestochowa University of Technology in Poland, which may limit the generalizability of the proposed quantitative analysis method. To confirm its universality, further research on various educational platforms and at other higher education institutions is necessary.

Moreover, while the study takes into account students' educational behaviors and demographic data, it does not consider other factors influencing motivation to learn, such as emotional states or external factors. To gain a more comprehensive understanding of student motivation, future research should include these additional elements.

AI can motivate students to learn. AI can adapt materials and pace of learning to the individual needs of the student, which increases self-efficacy – a key factor of motivation. Thanks to quick feedback, students can see progress more quickly, which strengthens intrinsic motivation. Many AI applications use game mechanisms, which increase engagement and motivation to continue learning. Students can independently explore content and choose what they learn, which promotes autonomous motivation. Generative AI (gen AI) has revolutionized the workplace by enabling professionals to do high-quality work in less time, according to research published in Harvard Business Review (2025). Whether it's developing a performance review, brainstorming a new session, or crafting a marketing email, people working with gen AI produce results that are both more efficient and often of higher quality. But our research reveals a hidden tradeoff: While gen AI collaboration increases immediate task efficiency, it can undermine employees' intrinsic motivation and increase boredom when they turn to tasks for which they don't have this technological help. The dependence of AI on motivation may be an interesting topic for further research on student motivation to learn.

In the future, it would be valuable to focus on developing personalized intervention strategies tailored to different motivational types, conduct longitudinal studies monitoring changes in motivation over time, expand the analysis with additional demographic data, and develop analytical tools that enable real-time feedback and interventions. Studying alternative motivational theories and testing the scalability of motivation indicators in different educational environments will enhance our understanding of student motivation and improve personalized teaching methods.

Ethics declaration: Ethical clearance was not required for the research

AI declaration: AI tools were not used the creation of the paper

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