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Beyond the Classroom Walls: Metacognitive awareness in traditional and online settings

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Abstract: Objective *– The aim of this study is to assess and compare the metacognitive awareness of university students in online and in-person learning environments. Secondly, the study aims to explore the students' preferences for online and in-person learning to compare the metacognitive awareness of students on the basis of their preferences.*

Methods *– A total of 79 university students completed the Metacognitive Awareness Inventory, providing self-reported data on their metacognitive awareness. The study used a paired sample t-test to compare mean scores of metacognitive awareness between online and in-person classroom settings. Additionally, the participants evaluated their experiences with online and in-person learning using a pairwise comparison as a scaling method.*

Results *– The t-test results indicate statistically significant differences in metacognitive awareness between online and in-person classroom settings. Specifically, significant differences were found in declarative knowledge, procedural knowledge, conditional knowledge, planning, information management strategies, monitoring, debugging strategies, and evaluation of learning. The students showed higher levels of metacognitive awareness across all facets in a traditional in-person learning setting. Descriptive analysis of scaling pairwise comparison revealed that online learning was strongly preferred for comfort, while in-person learning was the preferred modality for motivation to study and active participation. In contrast to the t-test results, ANOVA did not reveal significant differences in metacognitive awareness on the basis of students' preferences between online and traditional learning settings.*

Conclusions *– The results provide valuable information on the metacognitive awareness and preferences of the students in two different learning environments.*

Keywords: *metacognitive awareness, online learning, pairwise comparison, in-person learning*

Introduction

In the changing landscape of education, different ways of teaching and learning have grown, and online learning is now a popular alternative to traditional in-person methods. The world of online education, which has expanded significantly in recent years as a result of the pandemic, offers students dozens of new ways to learn. The way of learning that existed before the pandemic is becoming more and more outdated every day. Universities are working to offer more flexible

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and accessible learning experiences, and it is becoming important to understand how students navigate and adapt their cognitive processes in the online environment. To gain a comprehensive understanding of how students engage with learning, our focus revolves around exploring their metacognitive awareness. This paper examines how university students perceive and employ their metacognition in both online and in-person learning settings.

Metacognition is a powerful tool in education. Mesárošová, Bavoľár, and Slavkovská (2018) described metacognition as the ability to monitor one's own cognition and to regulate the complex learning process. This means that those individuals who are skilled in metacognition are often better at planning, organising, and adapting their cognitive strategies to different situations. More importantly, according to Dunn et al. (2021), metacognition helps to form autonomous students, increasing their consciousness of their own cognitive processes and their self-regulation so that they can regulate their own learning and transfer it to any area of their lives. It seems that metacognition plays a crucial role in education for students, teachers, and educational psychologists.

When students' learning is being explored, the term 'learning style' often emerges in educational psychology. Unfortunately, the area of learning and cognitive styles was extensively criticised in the past for test overload, confusing and overlapping definitions, and inadequate evaluations, as shown in the studies by Curry (1990), Sadler-Smith (2001), or Coffield et al. (2004). On the other hand, metacognition provides a link between learning and understanding in a more complex way. Mareš (1998) described learning style as a kind of metacognitive potential of every student. We see metacognition as a path to a more comprehensive understanding of learning styles. In the context of students, metacognitive awareness involves being conscious and knowledgeable about one's own thinking and learning strategies. It goes beyond simply acquiring knowledge and skills. It includes awareness of how one learns and an ability to regulate and adapt one's learning strategies.

There are several different approaches to conceptualising and studying metacognitive awareness, such as the developmental approach, cultural approach, or componential approach. The developmental approach focuses on how metacognitive awareness develops over time, from childhood through adulthood. According to Brinck and Liljenfors (2012), it examines how children gradually acquire metacognitive skills and how these skills continue to develop and change at different stages of development. The cultural approach examines how social and cultural factors influence metacognitive awareness. Heyes et al. (2020), who support the cultural origins hypothesis of metacognition, claim that this approach considers how people's metacognitive beliefs, strategies, and behaviours are shaped by social interactions, cultural norms, and educational practices. On the other hand, the componential approach breaks down metacognitive processes into discrete components, such

as metacognitive knowledge, monitoring, and regulation. This approach emphasises the distinction between different facets of metacognition and how they interact. In this study, we have focused on the componential approach as it was described by Schraw and Dennison (1994). This approach allows researchers to examine metacognitive awareness in a comprehensive manner, which provides a more nuanced understanding of metacognition and its underlying processes. By focusing on discrete components of metacognitive awareness, the componential approach enables researchers to identify specific mechanisms and processes that contribute to metacognitive functioning.

According to Schraw and Dennison (1994), metacognition involves two simultaneous levels of thought, knowledge and regulation. The first level is the student's thinking about the specific subject content and the second level is the student's thinking about their learning. Students who are metacognitively aware demonstrate self-knowledge. They know what strategies and conditions work best for them while they are learning. Declarative, procedural, and conditional knowledge is essential for developing conceptual knowledge, in other words, content knowledge. Regulation, as another level of metacognition, refers to students' knowledge about the implementation of strategies and the ability to monitor the effectiveness of their strategies. When students regulate, they continuously develop and monitor their learning strategies on the basis of their evolving self-knowledge.

As technology, cognitive science, and educational methods progress, the way researchers study metacognitive awareness is also changing with the latest discoveries and trends. Recently, research on how digital tools and platforms impact on students' metacognitive strategies and awareness has come to the fore. The results of the quasi-experimental research study by Khodaei et al. (2022) did not show a significant difference between the mean metacognitive awareness scores before and after the implementation of online asynchronous teaching in university students. However, Yuan, Aftoni, and Cobanoglu (2020) revealed a significant difference in the domain of metacognitive awareness between experimental classes where blended learning was introduced and control classes without technology. Altoik, Baser, and Yükseltürk (2019), using a quasi-experiment in Turkey, found that the use of an e-learning environment combined with a video portfolio was effective at increasing students' metacognitive awareness and promoted the foreign language learning process.

The above-mentioned studies collectively highlight the intricate relationship between digital learning environments and metacognitive awareness. Although the study by Khodaei et al. (2022) suggests that asynchronous online teaching may not necessarily impact research in metacognitive awareness by Yuan et al. (2020) and Altoik et al. (2019) underscores the potential of carefully designed digital interventions, such as blended learning and specific combinations of

e-learning tools, to enhance students' metacognitive awareness. These diverse outcomes underscore the importance of considering contextual factors and the specific nature of digital interventions to understand their impact on metacognitive processes, providing valuable information for teachers and educational psychologists seeking to optimise online learning experiences.

The current study aims to build on the previous research findings. The comparison of the metacognitive awareness of the same students in online and traditional learning settings can provide an interesting view on different learning environments. The primary objective of this study is to perform a comprehensive examination of the metacognitive awareness of the students in two learning settings, online and in-person, as well as their perceptions of these modalities. This research employs a quantitative approach to identify potential differences in students' self-awareness of their knowledge and regulation of the knowledge between in-person and online learning settings. Additionally, the study utilises a pairwise comparison technique to investigate students' perceptions of online and in-person learning across various criteria to explore potential differences in metacognitive awareness among students on the basis of their preferences for the different learning modalities. By integrating two methods, this study aims to provide a holistic understanding of the effects of the learning modality on both metacognitive awareness and student perceptions.

Methodology

The participants, data collection, instruments, and procedure of the current research study are described in this section.

Participants

In this study, the participants consisted of 79 students from the Department of Psychology at Pavol Jozef Šafárik University in Košice. The majority of the participants were women (N = 71), reflecting a female-dominated sample. The average age of the participants was 23 years. While the selection of respondents was occasional, we focused on university students who had personal experience with both forms of learning.

Data Collection

Data was collected in November 2022, a period during which the participants had recently completed a semester of online learning and were currently engaged in in-person classes. At this specific point in time, the participants were asked to assess their metacognitive awareness for both online and in-person learning settings. Our goal was to take advantage of a situation in which the students had fresh experience with both learning modalities.

Instruments

To determine metacognitive awareness, we decided to use the questionnaire

method. The advantage of standardised questionnaires lies mainly in the fact that they allow for a reliable comparison of the experience of different participants in different teaching environments. It was also the most suitable method for comparing the metacognitive awareness of the students online and in person at the same time.

The participants completed the Metacognitive Awareness Inventory for Students (MAI) by Schraw and Dennison (1994). The questionnaire consists of 52 items divided into eight subscales: (1) Declarative Knowledge; (2) Procedural Knowledge; (3) Conditional Knowledge; (4) Planning; (5) Information Management Strategies; (6) Monitoring; (7) Debugging Strategies, and (8) Evaluation of Learning. Each of these subscales contributes to a comprehensive understanding of an individual's metacognitive awareness by examining various dimensions of cognitive processes.

Declarative Knowledge focuses on assessing a student's awareness of general facts and information related to cognitive processes and learning. Procedural Knowledge involves understanding the steps or processes involved in cognitive tasks. The subscale evaluates a student's awareness of how to carry out various cognitive activities. Conditional Knowledge refers to understanding when and why to use specific strategies in different situations. This subscale assesses a student's awareness of the conditions under which particular cognitive strategies are effective. Planning evaluates a student's ability to plan and organise their cognitive activities. It assesses how well individuals can set goals and create a roadmap for achieving them. Information Management Strategies involve skills related to organising and processing information. The subscale assesses the student's awareness of strategies for managing and manipulating information effectively. Monitoring relates to a student's ability to keep track of their own cognitive processes. It assesses the extent to which individuals can monitor their understanding and performance during learning activities. Debugging Strategies involve the ability to identify and correct errors in one's thinking or understanding. The subscale assesses a student's awareness of strategies for identifying and fixing mistakes in their cognitive processes. And finally, Evaluation of Learning focuses on assessing a student's ability to reflect on and evaluate their own learning. It includes awareness of the effectiveness of different learning strategies and the overall learning process.

Together, the subscales determine the student's metacognitive awareness on two levels, knowledge and regulation. The knowledge level focuses on the knowledge of metacognitive factors that influence the learning and performance of students and on the knowledge of various appropriate strategies to improve learning processes. The regulatory level includes setting goals, planning, implementing the plan, monitoring progress, and evaluating the results of students' efforts to improve their learning. Mesárošová and Mesároš (2012) verified the reliability of the questionnaire

on a sample of high school students from eastern Slovakia. The Cronbach's alpha estimate of internal validity for overall metacognitive awareness of their sample was 0.91; for knowledge of cognition 0.81 and for regulation of cognition 0.87.

In addition to MAI, the participants engaged in a pairwise comparison exercise. Pairwise comparison is a scaling method used in various fields to assess and rank the relative importance of different items or preference for them. This method involves comparing each item in a set with every other item to determine their relative significance. It is commonly used in decision-making processes, prioritisation, and evaluating preferences. In our research, the students were asked to evaluate their experiences with online and in-person learning on the basis of four criteria: comfort, difficulty, motivation to study, and active participation. When creating these criteria, we relied on our previous findings (Madarászová & Mesárošová, 2022), when students and teachers evaluated online and face-to-face teaching in terms of their perceived advantages and disadvantages. In our current research, the participants were asked to choose one of the following options: "online", "in-person" or "the same" for each criterion.

Procedure

The participants were informed of the purpose of the study and gave their voluntary consent to participation. They were then given the MAI questionnaire and asked to evaluate their metacognitive awareness for both online and in-person learning environments. In the original version of the MAI questionnaire, the students had to state whether the individual statements were true or not for them. In this study, the task for the respondents was to express the percentage to which the given statement applies to them. The percentage expression of the validity was indicated for in-person and online forms of teaching. The participants provided responses to the questionnaire during a single session.

The pairwise comparison method allowed the participants to express their preferences or perceptions regarding the two learning modalities in a structured manner. By comparing items in pairs rather than rating them individually, the pairwise comparison method reduces response bias and ambiguity. Participants focus on comparing two options at a time, which can lead to more accurate and reliable judgments compared to other ranking methods. Frequencies and percentages were calculated for each response category within each criterion. The distributions of the responses are visually represented in the results section of the paper.

Results

In this section, the results of the differential analysis and pairwise comparison are described and visually represented. The results are further discussed and limitations as well as suggestions for future research are mentioned in the discussion.

Differences in metacognitive awareness based on the learning setting

The paired sample t-test results (Table 1) indicate statistically significant differences in metacognitive awareness between online and in-person classroom settings with regard to both levels of metacognitive awareness. At the level of knowledge, the students reported higher mean scores in the in-person setting (M = 71.5, SD = 11.4) compared to the online setting (M = 63.9, SD = 13.0). The mean difference was statistically significant (t = 4.67, p < 0.001), with a large effect size (d = 0.738). Similarly, at the level of regulation, the students also reported higher mean scores in the in-person setting (M = 66.1, SD = 11.1) compared to the online setting (M = 60.6, SD = 13.0). This difference was statistically significant (t = 4.74, p < 0.001), with a comparable effect size (d = 0.749).

To gain a better understanding of the differences in metacognitive awareness, difference analysis was conducted for all the factors of the metacognitive awareness inventory (Table 2). The analyses of various dimensions of metacognitive awareness revealed significant differences between the two learning environments. Notably, for declarative knowledge, the t-test yielded a highly significant result (t = 6.95, p < 0.001, d = 0.782), indicating that the students reported significantly higher metacognitive awareness in in-person settings compared to online learning. A similar pattern was observed for procedural knowledge (t = 5.57, p < 0.001, d = 0.627), conditional knowledge (t = 6.35, p < 0.001, d = 0.714), planning (t = 6.85, p < 0.001, d = 0. 771), comprehension monitoring (t = 5.65, p < 0.001, d = 0. 636), information management strategies (t = 6.35, p < 0.001, d = 0.715), and debugging strategies (t = 4.55, p < 0.001, d = 0.512). These results consistently indicate that, across multiple facets of metacognitive awareness, the students perceived superior metacognitive skills in in-person settings compared to online. However, it should be noted that in the evaluation of learning, while the t-value was significant (t = 2.36, p = 0.021, d = 0.266), the difference was comparatively smaller. These results emphasise

Table 1 Differences in metacognitive awareness according to the learning setting

Levels of Metacognitive Awareness	Learning Setting	M	Me	SD	t	p	Effect Size
Knowledge	In-person	71.5	72.4	11.4	4.67	< 0.001*	0.738
	Online	63.9	65.7	13.0			
Regulation	In-person	66.1	67.3	11.1	4.74	< 0.001*	0.749
	Online	60.6	63.4	13.0			

*$p < 0.001$

the statistically significant distinctions in metacognitive awareness between the two learning settings, with the students consistently reporting higher metacognitive scores across these facets in an in-person setting compared to online learning.

Students' preferences based on comfort, difficulty, motivation to study, and active participation

This study used pairwise comparison to assess the students' perceptions and preferences regarding online and in-person learning. The distributions of the responses are visually represented in Figure 1 for four criteria: comfort, difficulty, motivation to study, and active participation.

For the criterion of comfort, a significant majority of the participants (96%) expressed a preference for online learning, citing it as a more comfortable modality. Only three students (4%) found in-person learning to be more comfortable, and none indicated an equal level of comfort for both settings.

Table 2 Differences in all factors of metacognitive awareness according to the learning setting

Factors of Metacognitive Awareness	Learning setting	M	Me	SD	t	p	Effect size
Declarative Knowledge	In-person	73.6	74.0	13.2	6.95	< 0.001**	0.782
	Online	65.7	65.4	13.2			
Procedural Knowledge	In-person	69.1	72.9	16.3	5.57	< 0.001**	0.627
	Online	63.1	67.1	15.6			
Conditional Knowledge	In-person	71.1	64.3	15.0	6.35	< 0.001**	0.714
	Online	63.6	58.6	16.2			
Planning	In-person	73.5	68.0	14.2	6.85	< 0.001**	0.771
	Online	65.8	63.0	15.6			
Comprehension Monitoring	In-person	60.8	78.0	17.4	5.65	< 0.001**	0.636
	Online	55.0	74.0	17.1			
Information Management Strategies	In-person	67.4	58.3	12.3	6.35	< 0.001**	0.715
	Online	61.9	56.7	14.2			
Debugging Strategies	In-person	78.4	74.0	11.2	4.55	< 0.001**	0.512
	Online	73.1	65.4	14.9			
Evaluation of Learning	In-person	56.7	72.9	14.7	2.36	0.021*	
	Online	54.3	67.1	15.3			0.266

*$p < 0.05$, **$p < 0.001$

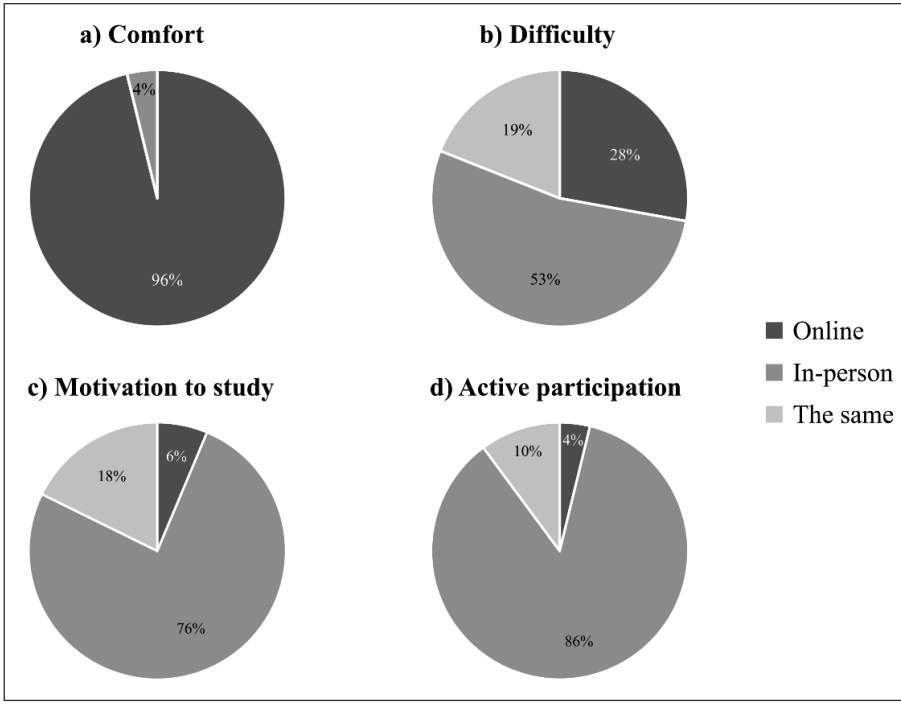

Figure 1 Distribution of students' preferences across four criteria

Regarding perceived difficulty, the findings revealed that 42 participants (53%) found in-person learning more difficult, while 22 participants (28%) reported greater difficulty with online learning. Additionally, 15 participants (19%) perceived both modalities as equally difficult, underscoring the nuanced nature of students' experiences with difficulty across learning environments.

In terms of motivation to study, a substantial majority (76%) expressed a strong preference for in-person learning. Only five participants (6%) selected online learning for the motivation criterion, and 14 students (18%) indicated an equal level of motivation to study for both settings.

Active participation exhibited a pronounced preference for in-person learning, with 68 participants (86%) saying they participated actively in in-person classes. In contrast, only three participants (4%) reported active participation in online learning, and eight students (10%) perceived both modalities as having equal levels of active participation.

Differences in metacognitive awareness according to students' preferences

To link the findings of the pairwise comparison with the questionnaire data, we sought to determine whether there were differences in metacognitive awareness between the students who rated online and in-person learning differently. Table 3 provides the results of the ANOVA, which was conducted to reveal the differences in the levels of metacognitive awareness between students' preferences.

The analysis of the variance did not reveal any significant differences in the metacognitive awareness of the students on the basis of their preferences between learning in-person and online. There seems to be no difference in metacognitive awareness on the basis of the students' perceived comfort, difficulty, motivation, or participation.

Discussion

The consistent pattern across the results suggests that the students evaluated various aspects of metacognitive awareness higher for the in-person modality, including declarative knowledge, procedural knowledge, conditional knowledge, planning, comprehension monitoring, information management strategies, debugging strategies, and evaluation of learning. These findings underscore the impact of instructional settings on diverse facets of metacognitive processes, emphasising the need for tailored strategies to enhance online learners' metacognitive skills.

Several psychological factors could have contributed to the perceived higher scores for metacognitive awareness in the in-person learning environment compared to the online one. Traditional in-person learning provides a more direct and immediate social presence. The physical prox-

Table 3 Differences in metacognitive awareness according to students' preferences

		Students' Preferences across Four Criteria			
Levels of Metacognitive Awareness	**Learning setting**	**Comfort**	**Difficulty**	**Motivation to study**	**Active participation**
		F (p)	F (p)	F (p)	F (p)
Knowledge	In-Person	0.15 (0.701)	1.45 (0.127)	1.70 (0.196)	1.46 (0.246)
	Online	0.02 (0.877)	0.98 (0.454)	0.48 (0.622)	1.12 (0.338)
Regulation	In-Person	2.88 (0.098)	1.78 (0.089)	0.46 (0.634)	0.23 (0.796)
	Online	1.82 (0.185)	1.76 (0.067)	1.04 (0.363)	0.31 (0.735)

imity of instructors and peers can enhance the feeling of connectedness, which might have a positive impact on metacognitive processes or how students evaluated those processes. Additionally, the physical presence in a classroom might foster a stronger sense of accountability. Research from China by Mok, Xiong, and Bon Aedy Rahman (2021) revealed that students considered direct teacher-student interaction very important, and they missed it during online learning. Similarly, a German survey conducted by Letzel, Pozas, and Schneider (2020) revealed that students did not engage in discussions with their teachers during online learning. Building on that, we presume that the presence of the instructor and peers in the same physical space may motivate students to engage more deeply with the learning material and monitor their understanding more closely. In other words, the students might have evaluated their metacognitive awareness higher for traditional learning because they expected to understand the curriculum better and to regulate their knowledge better when the teacher was present in the classroom.

Moreover, in traditional classrooms, students often receive immediate feedback from instructors and peers. This rapid feedback loop can aid in the development of metacognitive skills by allowing students to assess their understanding and adjust their learning strategies promptly. Previous research by Callender, Franco-Watkins, and Roberts (2015) found that feedback is an important component in improving metacognitive judgments. Moreover, the results of a quasi-experiment by Yılmaz (2022) revealed that learning analytics, which included direct feedback, increased participants' metacognitive awareness and academic achievement. In face-to-face interactions, non-verbal cues such as facial expressions, body language, and tone of voice play a significant role in communication. In our opinion, these cues can convey additional information that might be missing or less pronounced in online interactions. This might lead research participants to believe that their metacognitive skills are higher in-person compared to online classrooms.

Following the differential analysis, the descriptive analysis of the pairwise comparison revealed nuanced patterns of student preferences and perceptions on different criteria. Although online learning was strongly preferred for comfort, in-person learning emerged as the preferred modality for motivation to study and active participation during the lessons. The findings highlight the multifaceted nature of student experiences in various dimensions of the learning environment. Online learning may offer a higher degree of comfort because of factors such as flexibility in learning schedules, the ability to learn in familiar environments, and reduced social anxiety. Consistently with our findings, in a recent study by Hussein et al. (2020) the participants reported comfort or convenience as the most important positive aspect of online education. It seems that students feel more at ease when learning in the comfort of their own home, contributing to a preference for online learning with regard to this criterion. On the other

hand, in-person learning can be perceived as more challenging because of factors such as the pace of the class, the intensity of face-to-face interactions, or the immediate responsibility associated with physical presence in the classroom. We presume that online learning was seen as less demanding, allowing students to pace themselves and manage the difficulty level more independently. This is consistent with the results of Bulgarian research by Peytcheva-Forsyth, Yovkova, and Aleksieva (2018), in which students praised the online learning mainly because of the opportunity to learn at their own pace and work alongside their online studies.

Regarding motivation, in-person learning environments can foster a higher motivation to study through social interactions, immediate feedback from instructors, and a sense of community. We presume that the presence of peers and instructors in the same physical space may create a motivating atmosphere. Conversely, online learning might lack some of these motivating factors, contributing to a preference for in-person learning. Our suggestions are supported by the results of previous comparative research articles that point to an overall decrease in motivation to study during online teaching, for example Meeter et al. (2020), Usher et al. (2021), and Zaccoletti et al. (2020).

Similarly, active participation in in-person classes could be influenced by the immediate responsiveness of instructors and peers, as well as the structured and interactive nature of traditional classrooms. In contrast, online learning might be perceived as more isolating and thus potentially impacting on active participation. In this study, the majority of the participants reported that they participated actively in traditional in-person classrooms. In previous research (Miháliková & Mesárošová, 2023) the one-sided character of teacher-student interactions was revealed as students hesitated not only to initiate the conversation but also to respond to communication initiated by their teachers during the online lessons. We suppose that students may find it easier to engage actively when physically present.

Our result interpretations of the differential analysis and descriptive analysis revolve around the social presence of students in the traditional classroom. We presume that physical distance between students, their peers, and their teachers plays an important role in the experiences and study evaluations of students. Our interpretations are partly based on Altmann et al. (2018), who described transactional distance as the main obstacle to success of online education and its key disadvantage. Transactional distance includes the theory of cognitive space between teacher and student, which represents a psychological and communication barrier. This could be the reason for differences in students' evaluations of their metacognitive skills online and in-person, as well as differences in the pairwise comparison results.

Compared to the results of the paired sample t-tests, ANOVA revealed no significant differences in metacognitive awareness on the basis of students' preferences. Our findings suggest that students' prefer-

ences for learning in-person or online did not have a significant impact on their levels of metacognitive awareness across the four criteria that were examined. These results indicate that factors such as comfort, difficulty, motivation to study, and active participation do not seem to influence students' metacognitive awareness in the context of their learning preferences. There is a discrepancy in the results of the differential analyses as the students reported different levels of metacognitive awareness online and in-person, but no difference in metacognitive awareness was found that was based on their preference for online or in-person learning settings. In other words, there was no difference in reported online metacognitive awareness between those students who perceived online learning as more difficult and those who perceived it as a less difficult modality. The same pattern was revealed for all the criteria that were examined online and in-person. On the other hand, while the statistical analysis did not reveal significant differences on the basis of the students' preferences, it is still possible that meaningful trends or patterns exist within the data that warrant further exploration through qualitative methods or additional analyses.

Overall, the results of this paper lay the foundations for further statistical analyses to explore the significance of these preferences and perceptions, providing valuable insights into the complex dynamics between students and different modes of instructional delivery. In our opinion, both settings can provide opportunities for the development of metacognitive skills, and educators often play a crucial role in fostering metacognition regardless of the learning environment. However, our results suggest that the students' perceptions of their own metacognitive awareness may differ on the basis of their learning environment.

Lastly, it is necessary to address the limitations of the study that could have influenced its findings. These include the reliance on self-reported data from a questionnaire and pairwise comparison, which may be susceptible to social desirability and response biases. It is also important to note that the data on online learning was retrospective, as the students evaluated their metacognitive awareness and perceptions of online learning during the semester after the online period had ended. The students' perception of their metacognitive awareness might have differed during the online semester. Additionally, the small sample size limits the generalisability of the findings, while the homogeneity of the sample further restricts the diversity of perspectives represented. The cross-sectional design also precludes the establishment of causal relationships.

These limitations underscore the need for cautious interpretation of the findings and suggest avenues for future research to address these shortcomings and enhance the robustness of the conclusions. Future research may focus on longitudinal differences between in-person and online learning setting with the same sample of students reporting their experience with both learning modalities in the time. Another

suggestion for future research is to incorporate interviews with students or open-ended questions that could focus on other factors, such as students' attitudes towards online technologies.

Conclusion

In conclusion, the current study offers insights into the students' preferences and experiences from online and in-person learning settings. Physical proximity, immediate feedback, and non-verbal cues may be the key factors that highlight in-person learning in terms of the metacognitive awareness of students. On the other hand, online settings were perceived as a more comfortable and less difficult way to learn compared to in-person settings. However, students' preferences were not significant for their metacognitive awareness either online or in-person. Recognising and addressing these findings can contribute to the development of more effective and student-centred educational practices.

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MIHÁLIKOVÁ, R. Za hranicemi třídy: Metakognitivní povědomí v tradičním a online prostředí

Cíl: *Tato studie si klade za cíl zhodnotit a porovnat metakognitivní povědomí studentů univerzity v online prostředí a v prostředí tradičního, prezenčního učení. Zároveň zkoumá preference studentů týkající se online a prezenčního výukového režimu, aby bylo možné porovnat metakognitivní povědomí studentů podle jejich preference.*

Metody: *Celkem 79 studentů univerzity vyplnilo Dotazník metakognitivního povědomí, poskytující subjektivní data o jejich metakognitivním povědomí. Ve studii byl použit párový t-test k porovnání průměrných hodnot metakognitivního povědomí mezi online a prezenčním výukovým prostředím. Kromě toho hodnotili účastníci své zkušenosti s online a prezenčním výukovým režimem pomocí párového srovnání jako škálovací metody.*

Výsledky: *Výsledky t-testu naznačují statisticky významné rozdíly v metakognitivním povědomí mezi online a prezenčním výukovým prostředím. Konkrétně byly zjištěny významné rozdíly v deklarativní znalosti, procedurální znalosti, podmíněné znalosti, plánování, strategiích správy informací, monitorování, strategiích odstraňování chyb a hodnocení učení. Studenti prokázali vyšší úroveň metakognitivního povědomí ve všech oblastech v tradičním prezenčním výukovém prostředí. Popisná analýza párového srovnání odhalila, že online výuka byla silně preferována pro pohodlí, zatímco prezenční výuka byla preferovanou modalitou pro motivaci ke studiu a aktivnímu zapojení studentů v průběhu lekcí. Na rozdíl od výsledků t-testu ANOVA neukázala významné rozdíly v metakognitivním povědomí na základě preferencí studentů v online prostředí nebo v prostředí prezenčního učení.*

Závěry: *Výsledky studie poskytují cenné informace o metakognitivním povědomí studentů a jejich preferencích v obou výukových prostředích.*

Klíčová slova: *metakognitivní povědomí, online výuka, párové srovnání, prezenční výuka*