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Learning Strategies Used by University Students in Distance Learning

The main goal of our overview study is to present the learning strategies used by university students in the context of distance learning. The first and second chapters represent the theoretical part. Therefore, we first focused on the different definitions of learning strategies and their classification. The second chapter summarises and analyses the up-to-date state of theoretical and empirical concepts of the topic of learning strategies and specifically the topic of learning strategies used by students of distance learning. The third chapter, representing the practical part, formulates recommendations for pedagogical practice.

Keywords: distance learning, reading strategies, e-learning, self-managed learning, learning strategies

Strategie uczenia się używane przez studentów uniwersytetów w nauczaniu na odległość

Głównym celem naszego przeglądu jest przedstawienie strategii uczenia się stosowanych przez studentów w kontekście nauczania na odległość. Rozdziały pierwszy i drugi stanowią część teoretyczną zawierającą różne definicje strategii uczenia się i ich klasyfikacji. Drugi rozdział podsumowuje i analizuje aktualny stan teoretycznych i empirycznych koncepcji tematu strategii uczenia się, a w szczególności tematu strategii uczenia się stosowanych przez studentów w kształceniu na odległość. Trzeci rozdział, reprezentujący część praktyczną, formuluje zalecenia dotyczące praktyki pedagogicznej.

Słowa kluczowe: nauczanie na odległość, strategie czytania, e-learning, samozarządzanie kształceniem, strategie uczenia się

The main goal of this overview study is to present learning strategies in the context of distance learning.

Distance learning is a multimedia form of learning based on self-managed learning, in which the teacher and the student are physically separated from each other. Currently, the rapid development of e-learning has been underway – an effective variant of distance learning, which has initiated a significant development of virtual universities.

The multimedia form of e-learning is suitable for students preferring any of the learning styles. Visually oriented students will appreciate working with visual information and textual study materials. Auditive-oriented students are helped by combining images or text with sound. Psychomotor-oriented students prefer solving specific problems (Klement, Dostál, 2014, pp. 58–67), and according to Ivan Turek (2005) and Jiří Pavláček (2003), techniques related to activities help them. As people remember presented information faster and more deeply if they use more senses during its acquisition, we can say that in the e-learning environment, information is passed on to students in a form that helps them to remember it easily, faster and for longer. According to Nancy J. Lewis and Peter Z. Orton (2006), however, the learning strategy is more important than the learning style.

E-learning is associated with self-directed or self-regulated learning, i.e. a learning process in which the student plays a highly active role.

In e-learning, the student:

- identifies their educational needs,
- formulates their own educational goals,
- selects learning content,
- chooses a suitable learning strategy,
- chooses a suitable learning environment,
- plans the pace the learning,
- creates a realistic learning schedule,
- implements selected learning strategies,
- can motivate themselves,
- monitors situational obstacles and can overcome them,
- evaluates the effectiveness of their learning.

1. Learning Strategies

The terminology in the field of learning strategies is not yet completely clear and definite. Usually, learning strategies are conceived as a set of proce-

dures, methods, techniques and activities that students consciously or unconsciously use in the learning process and which lead to learning effectiveness, faster memorisation of more information and the recall of memorised information and its application (Vlčková, 2007, pp. 82–91). Contrary to this conception, Ewa Czerniawska and Maria Ledzińska (1994) define learning strategies as the conscious use of a specific procedure, specific activities and techniques in order to memorise and recall the information in a particular situation. According to Czerniawska and Ledzińska, the conscious use of a specific learning strategy increases the efficiency of the learning process, leads to faster memorisation of a larger amount of information, which the student is able to systematically classify, and it generally helps with in-depth learning. Czerniawska (1999) understands learning strategies as any way of organising learning activities in order to acquire new information. Jiří Mareš (1998) and Gordon Pask (1976) perceive learning strategies as a sequence of thoughtfully and purposefully arranged learning activities, by which the student implements a certain plan that leads to the solution of the task and achieves the learning goal. Richard Riding and Indra Cheema (1991) understand learning strategy as a tool or technique for managing a learning situation. While Claire F. Weinstein (1989) understands learning strategies as ways of behaving and thinking that enable learning, C.E. Weinstein (1989), Karel Hnilica (1992), Yesin Somuncuoglu and Ali Yildirim (1999) conceive of learning strategies as a repertoire of activities leading from simple study skills to complex thought processes. The connection between learning strategies and metacognitive processes is also emphasised by Maria Ledzińska (2000), Richard I. Arends (2012) or Tomás Janík (2013), who emphasises the connection between metacognitive processes and learning effectiveness.

A learning strategy that is appropriately chosen with regard to the goal of education leads to greater learning efficiency and positively affects the student's ability to search, obtain, systematise and acquire new information (Weinstein, Mayer, 2016).

1.1 Classification of Learning Strategies

Each student uses a certain repertoire of learning strategies; therefore, different classifications of learning strategies exist. For example, Somuncuoglu and Yildirim (1999) divide learning strategies into cognitive and metacognitive. They (1999) understand cognitive strategies as learning strategies that are used in the systematisation of new knowledge. They further divide cognitive strategies into superficial and in-depth strategies similarly to Susan b. Nolen (1988); while

Hnilica (1992) divides cognitive strategies into five main groups: text orientation strategies, information memorisation strategies, key information identification strategies, information summarisation strategies and information elaboration strategies.

Metacognitive strategies were examined by, for example, Hnilica (1992), who perceives metacognitive strategies as processes in which students reflect on their own cognitive practices. As metacognitive strategies, Hnilica considers the following strategies: strategies for generating questions to oneself; for monitoring text comprehension; for eliminating possible misunderstandings of a text. Peter Gavor (1988) has a similar view of metacognitive strategies as Karel Hnilica, i.e. as strategies applied when working with textual study materials. Metacognitive strategies help to self-regulate learning. The connection between self-regulation of learning and the use of metacognitive strategies is also recognised by Ledzis̄ka (2000), who also states that metacognitive strategies are developed and improved together with acquiring study experience. The link between age and the development of metacognitive strategies is also recognised by Weinstein (1989).

Classifications of learning strategies according to the function of the process of information processing of Michael O'Malley (1990) are also popular. O'Malley divides learning strategies into metacognitive, cognitive and social. Another favourite concept comes from Rebecca Oxford (1990), in whose conception learning strategies are understood as specific activities, behaviours, techniques and procedures. Oxford (1990) divides learning strategies into direct and indirect. Direct strategies facilitate understanding, storage and recall of information, as well as its transfer, leading to changes in cognitive structures and processes. Indirect learning strategies influence motivational and executive functions that kickstart, sustain and manage the information processing process and act indirectly upon it. Direct strategies are further divided into metacognitive strategies, affective strategies and social strategies, while indirect learning strategies include memory strategies, cognitive strategies and compensatory strategies.

2. Research on Learning Strategies

We date the beginnings of scientific research into learning strategies to the 1960s. The first research study on learning strategies was Aaron S. Carton's 1966 publication *The "Method of Inference" in Foreign Language Study*.

The first research studies (Stern, 1975; Naiman, Frohlich, Stern, Todesco, 1978; Rubin, Wenden, 1987) focused on finding the learning strategies used by successful students. The results of these first research surveys have shown that

the success of students in school is influenced more by the learning strategies they use than by their intelligence. These results are also in agreement with the results of research studies from the 1990s (De Jong, Liang, Lauber, 1994; Czerniawska, 1993; 1998). Based on these first research surveys from the 1970s, the first classifications of learning strategies were also created, e.g. Neil Naiman, Maria Frohlich, Hans H. Stern, Angie Todesco (1978). During this period, learning strategies were examined mainly in the field of foreign language learning.

Since the 1980s, in addition to cognitive, memory and metacognitive strategies, which had been the subject of scientific research previously, social and affective strategies have also been added. During this period, learning strategies were examined mainly in the field of foreign language acquisition (Oxford, 1990) and in the natural sciences (Nolen, 1988), but other educational areas are not neglected either. In the 1990s, research into learning strategies used in music teaching (Cantwell, Millard, 1994) and mathematics (Meyer, Turner, Spencer, 1997; Braten, Throndsen, 1998) appeared.

Among other things, these studies have shown that successful students use more learning strategies than unsuccessful students (e.g. Zimmerman, Pons, 1986; Vlčková, 2005), that successful students use different learning strategies than unsuccessful students (e.g. O'Malley, Chamot, Küpper, 1989; Manughbai, 1991; Wen, Johnson, 1997; Lind, Sandmann, 2003; Vlčková, 2005) and that, for example in the field of foreign languages, the key learning strategy is the strategy of regular practise (e.g. Oxford, 1987; Bialystok, 1990; Vlčková, 2005).

Table 1

Topics of research studies focused on learning strategies

Topic of the research study	Author/s
Identification, description and classification of strategies, terminology of the field	Wong-Fillmore, 1976, 1979; Rubin, 1981; Naiman et al., 1978
Development of learning strategies	Chipman, Segal, 1985; Brown et al., 1983; Adams, 1989
Creating a standardised research technique	Oxford, 1990; Weinstein, Palmer, Schulte, 2002
Effectiveness of learning strategies	Cohen, Aphek, 1981; Bialystok, 1981; Politzer, McGroarty, 1985; Zimmerman, Pons, 1986; Huang, Narsen, 1987; Artelt, 1999; Bremer, 1999; Lind, Sandman, 2003; Vlčková, 2004, 2007; Escribe, Huet, 2005

Learning strategies in the context of pupil characteristics	Reiss, 1981; Politzer, McGoarty, 1985; Oxford, Ehrman, 1987; Skehan, 1990; Stern, 1992; Lind, Sandmann, 2003; Vandergriff, 2005; Vlčková, 2003, 2007
Learning strategies in the context of environment characteristics	Wong-Fillmore, 1976, 1979; Naiman et al., 1978; Rubin, 1981; Davies, Kaplan, 1998; Vlčková, 2003, 2007
Learning strategies in the context of teaching characteristics	Oxford, 1990, 1994; O'Malley, 1990
Models of teaching the strategies	Brown, Campione, Day, 1981; Brown et al., 1983; Dansereau, 1985; Brown, Palincsar, 1984; Friedrich, 1992
Transfer of strategies to new situations and tasks	Palincsar, Brown, 1984; Borkowski, Weyhing, Carr, 1988
Learning strategies in the context of a language task	Weaver, Cohen, 1997; Chamot, El-Dinary, 1999; Fan, 2003; Vandergrift, Goh, Mareshcal, Hassan-taghdhari, 2005
Teaching learning strategies	Brown, Palincsar, 1989; Mandl, Friedrich, 1992

2.1 Results of Research Studies on the Use of Learning Strategies by Adult Learners

According to Malcolm S. Knowles (1975), most of us only know how to be taught, but we do not know how to learn, because no one has taught us that. Many adult students are not able to study fully independently, as they lack the ability to self-manage and the autonomous learning competencies, and they are dependent upon the teacher (Pryck et al., 2005, p. 44). According to Risto Jaakkola (1988), an insufficiently developed autonomous learning competence is caused by the following factors: weak internal motivation, lower flexibility, lack of study experience, use of ineffective learning styles and ineffective learning strategies. Therefore, according to Koen De Pryck et al. (2005), the task of the teacher is to develop students' independence and their autonomous learning competencies. The development of the independence of adult students and their autonomous learning competencies is gaining in importance in connection with the results of the research studies by Anna Petřková (1994) or Veronika Najvarová (2005), which discovered a low level of autonomous learning competencies in adult students. Petřková (1994) found that 26.3% of adult students describe their study style as unsatisfactory, 19% perceive it as partially satisfactory, and only 35.7% perceive their study style as satisfactory or sufficient. Similar results were obtained by Najvarová (2005), who found that 35% of students do not use any of

the pre-reading strategies, and only 84.2% of respondents use some strategies to organise new information (for better remembering, recalling and processing of information), such as Venn diagrams, schemes, mind maps, overviews or comparisons. The importance of reading strategies for effective independent study was also mapped by Annemarie Palincsar and Ann Brown (1984), who found that successful students ask internal questions when reading, which allows them to better understand the text and identify key information in the text, and they can summarise the text after reading and retell it in their own words.

Proactive learners learn more effectively and faster than reactive students (Knowles, 1975). Students who consciously use a certain learning strategy or several learning strategies reflectively approach the use of learning strategies and thoughtfully choose between learning strategies to use in a particular situation in order to achieve a specific educational goal, reflectively approach the learning process itself, can better systematise their knowledge and can remember information more easily and permanently. These students demonstrate an in-depth learning style, critical and creative thinking and a comprehensive understanding of the learning tasks assigned to them (Shuhaimi, Awaludin, Bakar, 2014). The use of learning strategies helps to memorise the curriculum faster and more permanently; moreover, it leads to deeper self-knowledge and personal development of the student (Cohen, 2007, pp. 180–207). Students who are convinced of their study abilities are confident that they will be able to fulfil the learning exercises assigned to them and show a higher level of mastery of the competence for self-directed learning (Pintrich, 1989; Dahl, Bals, Turi, 2005).

2.2 Results of Research Studies on the Use of Learning Strategies by Distance Learning Students

The topic of the use of learning strategies by students and the topic of the relationship between learning strategies and learning effectiveness is relatively well researched. However, there is little research on the use of learning strategies in distance learning students.

One of the research studies in this area was conducted at the Iowa State University College of Agriculture (Filcher, Miller, 2000, pp. 60–68). In this research, it was found that students look for a quiet, peaceful place to study so that they are not disturbed. Furthermore, it was found that the effectiveness of learning in self-directed learning is closely related to the student's mood, self-confidence, self-belief, perseverance, volitional and several character traits, such as ambition, diligence and self-motivation. Pryck et al. (2005) also state that the effectiveness

of learning in distance learning is influenced by the character traits of the student, the degree of their autonomy, previous study experience and motivation, specifically intrinsic motivation. Similar results were achieved by Wilbert J. McKeachie et al. (1986), Isabella Pavelková (2002). According to Barbara L. McCombs (1988) and Michael G. Moore (1989), the higher effectiveness of learning for distance learning students is mainly related to motivation, both internal and external. A research survey conducted in 1993 by a research team consisting of Rebecca Oxford, Young Park-Oh, Sukero Ita and Malenna Sumrall (1993) confirmed that motivation is the most important factor influencing the effectiveness of learning for distance learning students, and the same results were obtained by Frank J. Sinkovich (1991). Research has shown that motivated students use a wider repertoire of learning strategies (Vlčková, 2003, pp. 61–68), as well as metacognitive strategies (Vandergriff, 2005). According to Greg Miller and Ana Carr (1997), the e-learning environment itself is motivating and supportive for students in developing learning strategies and metacognitive strategies, as G. Miller and A. Carr found that students in the e-learning environment show more interest in using effective learning strategies, they think more about the learning process, and they plan their study activities and monitor and evaluate the results of their learning.

Studies have shown that if students are not sufficiently motivated to learn, then they will not achieve the expected results in learning, even though the course itself appears attractive in its content (Allen, 2016). According to Andrea Barešová (2011), the level of motivation of students is influenced by their participation in educational activities, cooperation within the online environment, quality feedback and the level of their learning competencies.

Miller and Carr found that contact with other classmates and tutors was very important for students. The research found that most distance study students maintain contact with their classmates, together with whom they motivate, support and help each other; only 18.9% studied solely on the basis of tutorials. Barešová (2011) also found that collaboration is one of the most effective stimulants for distance learning students. Tools that support collaboration include document sharing and editing, discussion forums, brainstorming, group activities, chat, tutoring, mentoring, online meetings and virtual classroom. Important tools also include tests, quizzes and simulations, which offer students a chance to test their knowledge without any risks. Online communication not only helps increase student motivation, but also mediates the exchange of information within the virtual environment.

Frequent communication and cooperation with the tutor are of high importance as well. Miller (1997) found that students who frequently seek the effective help of a tutor were more likely to receive an “A” grade on the exam. According

to Barešová (2011), collaboration in the form of the student's interaction with the tutor enables monitoring of the student's progress, increases the student's motivation to study, and it also reduces the risk of procrastination. According to Pryck et al. (2005), the role of the tutor is to motivate students to perform assigned tasks and other learning activities and to support the student in achieving the goal of the course, also by, for example, indicating how to achieve these goals. Pryck et al. (2005) also considered students who have a low level of autonomy and state that distance learning can also be implemented for these dependent students who have insufficiently developed autonomous learning competencies. Pryck et al. (2005) further state that underdeveloped autonomous learning competencies can be eliminated by controlled constructive interaction between the tutor and students and the use of structured study materials with predefined goals and set learning tasks that evoke indirect virtual dialogue, in which the student communicates with the text. The text is supplemented by questions leading to the student's self-reflection and other self-assessment activities that allow the student to control the effectiveness of their learning. The content of the course consists of, for example, reading materials, assignments, case studies, simulations with instructions for students and tests. Course activities should develop students' critical thinking, develop a repertoire of learning strategies used and require the application and analysis of memorised information.

Other tools used in the virtual environment also contribute to the effectiveness of distance learning and the higher success of students in their studies. For example, the research study by Miller (1997) found that successful students were more likely to use self-testing, using tests and quizzes used in an e-learning course.

Research by Dutch researchers Jayee Neroni, Celeste Meijis, Hieronymus J. Gijselaerse, Paul A. Kirschner and Renate H.M. Groot (2019), in which 758 distance learning students participated, pointed out the connection between learning effectiveness and the choice of an appropriate learning strategy and notes that motivation, the ability to plan, the ability to reflect on one's personal learning strategies and the use of diverse learning strategies, including metacognitive strategies, help with study success.

For some distance learning students, however, the use of diverse learning strategies is a problem, because, as Chris J. Morgan, Donald Dingsdag and Helen Saenger (1998) found, adult distance learning students use only a limited repertoire of learning strategies. Matthew Peacock (2001) also states that adult students only use those learning strategies that have worked for them in the past and are therefore convinced of their effectiveness. According to Najvarová (2005), the most frequently used learning strategies for distance learning students include a

retelling of a study text in their own words, which is how students check whether they have understood the text sufficiently (this strategy was used by 54.3% of respondents), whilst 15.7% of students read the text and compiled an overview of the information obtained, and 17.1% of students used mnemonic aids.

According to an Australian longitudinal research survey (Lyall, 2005), the following learning strategies are key for distance learning students. Before beginning the acquisition of information from textual study materials, students use a preliminary reading in which they “scan the text”, followed by an in-depth reading in which students read the text carefully in order to memorise as much information as possible from the text. In the in-depth reading phase, students approach the text interactively and critically, visually emphasising key information in the text, writing notes in the text that help them navigate the text, categorising information and creating their personal notation system. Students also consider retelling the read text in their own words to be an effective learning strategy.

Walter Pauk (2000) realised the importance of writing effective study notes more than 50 years ago, creating the Cornell method for his students (the name is based on the university at which he taught). The aim of this method is for students to make clear notes, recite the material in their own words, which makes it easier to remember and recall the information, and then to recapitulate the knowledge and be able to summarise it.

3. Recommendations for Pedagogical Practice

Milan Klement (2012) states that a learning strategy is an important determinant of the effectiveness of distance education. According to Kateřina Vlčková and Jarmila Bradová (2014), the knowledge of effective learning strategies, their adequate selection and appropriate use also have a positive effect on learning effectiveness.

Based on the presented analysis of domestic and foreign research studies on the issue, we have formulated the following recommendations for tutors implementing distance learning.

- In distance learning, it is necessary to help develop students' autonomous learning competence, knowledge of diverse learning strategies and reflective use of learning strategies, as it is important for distance learning to:
 - know diverse learning strategies;
 - use diverse learning strategies;
 - adequately select a learning strategy according to the specific situation in order to achieve a specific education goal;

- reflect upon the effectiveness of used learning strategies;
- help develop reading strategies used by students – this is necessary because distance learning students predominantly work with text study materials.
 - The motivation of students is important for success in studying, which is helped by increasing collaboration in the form of student-tutor interaction, which in turn allows for the monitoring of student's progress, increases student's motivation to study and also reduces the risk of procrastination. Equally important, however, is the collaboration of students with each other. Therefore, we recommend the greatest possible involvement of tools that support collaboration: chat, virtual classroom, discussion boards, brainstorming sessions, group activities, tutoring, mentoring, online meetings.
 - Since self-testing helps the effectiveness of distance learning, with the use of tests, quizzes or simulations that can be used in e-learning courses, it is highly recommended to include and use them in every lesson, giving students the chance to test their knowledge without taking any risk.

Conclusion

Learning strategies currently rank among the most important research topics in the field of educational psychology, andragogy, general and subject didactics, as well as among the most important topics of educational policy as included in current educational documents, such as the Framework Educational Programme for Primary Schools and the Framework Educational Programme for Grammar Schools, in which the acquisition of effective learning strategies is stated as one of the main goals of primary and secondary education with a general focus. In the context of lifelong learning, learning strategies play an indispensable role, which is why they are also given attention in international documents on adult education published by UNESCO or the European Union. As the used learning strategies can be purposefully developed and influenced, both for children and adult students, they are an important topic for pedagogy and andragogy.

Our review study aimed to present the learning strategies used by university students in the context of distance learning. Although the origins of scientific research into learning strategies date back to the 1960s, there is little research on the use of learning strategies among adult distance learning students.

As part of the theoretical part of the review study, we focused on the definitions of learning strategies and classifications of learning strategies, and in the second chapter, we summarised and analysed the current state of theoretical and

empirical solutions to learning strategies, with an emphasis on the use of learning strategies by distance learning students.

The practical part is represented by recommendations for pedagogical practice, i.e. recommendations for tutors implementing distance learning, which is based on the presented analysis of domestic and foreign research studies on the topic.

However, due to the low level of research on the issue, research into the learning strategies used by adult distance learning students faces many interesting questions, which are gaining in importance and urgency due to the development of distance learning and virtual universities.

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