

## The relationship between learning styles, gender and learning outcomes

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### Abstract

This research is based on the fact that many lecturers have difficulty determining the proper strategy to improve learning outcomes in heterogeneous classes. This research aims to identify students' learning styles from the gender perspective and describe the related learning strategies to support the learning process. The method used in this study is the descriptive research design. Primary data were collected using questionnaires. The sample comprised 30 German students in the second semester (15 male and 15 female students), who were randomly selected. The results indicated that, overall, there was a correlation between learning styles, gender and learning outcomes. According to the research findings, it can be concluded that learning style and gender can contribute to the learning outcome, especially language skills of the students.

Keywords: Gender, language learning, learning outcomes, learning process, learning styles

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## 1. Introduction

In this era of globalisation, learning German as a foreign language is more than just mastering both grammar and vocabulary, it is about how to use it in daily communication. This means that foreign language learning is more practice-oriented which allows learners to interact with other people in certain communication situations and contexts (Funk et al., 2018). The achievement of learning outcomes that is oriented towards social communication interactions requires the teacher's role in managing the learning process. Lai et al. (2018) emphasised that a quality learning process is a learning that involves creative and innovative processes in it. As the frontline in the learning process, teachers are responsible for designing and preparing lesson plans, implementing these plans and evaluating learning to assess whether learning objectives are being achieved. Related to that, a teacher must be able to choose appropriate learning strategies for students, considering that each student has different characteristics (Tjabolo & Herwin, 2020).

Organising a heterogeneous language class, in order to provide a social interaction between learners to construct a context-related communication, is really not easy. As a teacher, learning a foreign language cannot simply be forced or prescribed to the learner like medicine. There are some aspects from the learners themselves that contribute a lot to language learning. According to Ballweg et al. (2013), attitudes towards teaching, motivation and their learning strategies are some of the important factors.

The emphasise on these factors needs to be considered, because traditionally the classroom is a learning community, which consists of heterogeneous individuals who have different characteristics, such as age, gender, language suitability and emotions, e.g., anxiety, motivation, attitude, culture, prior knowledge and individual learning style or learn preference (Brinitzer et al., 2016). Likewise, the results of the research by Doyle (2006), cited by Schart and Legutke (2018), illustrated that in language teaching many individuals with different characteristics, behaviours or interests come together and determine the learning outcome. This individual difference has become a popular issue emphasised by teachers and researchers in organising student-centred learning environments (Balci, 2017).

However, in the learning process many teachers are not aware of the differences in the learning styles of each student and the importance of applying various learning methods that are suitable for students' learning styles. Some of them, therefore, have problems in determining appropriate strategies to improve learning outcomes. Conceptually, various theories developed based on research results prove that knowing these preferences can help lecturers choose learning activities based on student-oriented learning principles, motivating them to achieve better learning outcomes.

### 1.1. Conceptual or theoretical framework

Various contextual and individual factors could influence students' learning outcomes; one of them is learning style (Chen et al., 2018). Some experts gave different definitions of learning styles. Kai (2015) described learning style as a combination of learner-specific cognitive, emotional, and physiological characteristics applied in one learning environment. Learning style is a process that consists of various methods used to form cognitive perceptions in processing information as a concept and principle (Leasa et al., 2018; Othman & Amiruddin, 2010). Kolb (1984), stated that learning styles are described as method that individuals prefer to receive and process the information personally. In a learning process, each person processes information and understands it differently. It is individualistic and influenced by learning styles. Sener & Cokcalışkan (2018) identified six learning styles, different from those presented by Fleming in 1995. The six learning styles identified by Sener & Cokcalışkan are, visual, auditory,

kinesthetic, tactile, group learning, and individual learning. Meanwhile, the learning style model developed by Fleming (1995) in the Student Center Learning is simpler, consisting of four learning styles; visual, auditory, reading, and kinesthetic (VARK).

The visual group prefers information that comes in the form of graphs, charts and flow charts. The auditory group tends to use reading and writing as their first choice to absorb information. Colorosa et al. (2014) underlined those in auditory group learn best through listening and speaking; therefore the words spoken are essential. Students in this group express themselves through verbal exchange, dialogue, and talking. On the contrary, the kinaesthetic group prefers concrete and multi-sensory experiences, also conceptual and abstract material accompanied by appropriate analogies. Learners in this group are active listeners, and prefer practical tasks and activities.

Dincol-Ozgun (2018), in his research on the influence of learning styles, found that there are differences in learning preferences between those who like to learn visually, auditorily and kinaesthetically. Diagrams, charts, graphs, photographs, illustrated textbooks, films, overhead transparencies, flip charts, and handouts work best for visual learners.. Auditory learners learn best by listening to lectures or what others have to say; kinaesthetic learners learn best with a hands-on approach.

Gender is one of the most important elements in learning preferences, as evidenced by almost all previous studies. The majority of these studies reveal significant differences in learning methods between males and females. Each learner has a unique learning style, such as auditory, visual or kinaesthetic. In their research, Maqbool et al. (2018) found that most students in the classroom preferred an auditory learning style, wherein they learn through reading or listening. In addition to the auditory learning style, other students choose visual or kinaesthetic learning styles, or a combination of both. According to Shuib and Azizan (2015), what is currently a problem and a matter of debate among researchers is whether gender differences also affect the preferences of each student's learning style.

In terms of verbal ability, it was explained that women are better at various verbal tasks; this diversity could present a unique challenge for the lecturer in preparing the precise method and learning strategy that directly impacts the students' learning outcome. Concerning the actual foreign language learning principle, which is more oriented on the student (SCL), teachers must pay more attention to the students' needs. Nowadays, foreign language learning has changed from a teacher-centred approach to a learner-centred approach. In addition, the current learning process is more emphasised on the learning process itself than on the learning product. Therefore, foreign language learning strategies are currently a concern, because various individual factors play a role in them (Zokaei et al., 2012).

### *1.2. Related research*

The difference in male and female learning outcomes is also emphasised by Ramezani et al. (2015). Most of the female students prefer the auditory learning style, while most of the male students prefer the kinaesthetic learning style. On the other hand, another study found significant differences in learning style preferences between male and female undergraduate physiology students. Female students preferred only one type of learning model, be it visual, auditory, reading or kinaesthetic. However, in this study, female students preferred the kinaesthetic learning style. On the contrary, male students were more inclined to the multimodal learning style (Wehrwein et al., 2007).

Previous research has successfully tested and shown that those differences in learning styles have an effect on self-regulated learning skills of chemistry and science teacher (Dincol-Ozgun 2018). The others found that most female students preferred the auditory learning style, while most male students

preferred the kinaesthetic learning style (Ramezani et al., 2015); however, the students in grade school is more probably to optimise just one learning style mode in accessing information (Leasa et al., 2018). However, the study by Wehrwein et al. (2007), which showed a tendency for students to choose multimodal learning styles, did not correlate the differences in these learning styles with their learning outcomes.

### *1.3. Purpose of the study*

Various studies have been conducted to see whether there are differences in learning styles between genders, as well as the relationship between learning styles and student learning outcomes. However, there are no studies that directly assess the relationship between learning styles, gender and learning outcomes, especially in the German language programme in Indonesia, where the class is very heterogeneous. Understanding this relationship will have a positive impact on determining learning strategies in the classroom. For this reason, this study aims to determine the following: 1) What learning styles are generally preferred by the students of the German Language Department? 2) Are there differences in learning styles between genders? 3) Is there a correlation between learning style, gender and learning outcomes?

## **2. Method and materials**

### *2.1. Research model*

The method used in this research is the correlation descriptive method. This research has three variables which consist of two independent variables, which are the learning style and the gender, and the dependent variable is the learning outcomes. This method is used to determine whether there is a correlation between the three variables, i.e., whether learning styles and gender contribute to student learning outcomes or not.

### *2.2. Participants*

As has been explained, the research aimed to know whether there is a correlation between learning styles, gender and student learning outcomes. For this reason, the unit of analysis for this research is the students. It means that the main required data were collected from students of the German Language Department, Faculty of Teachers Training and Education, Pattimura University, Ambon. The sample consisted of 30 students (15 female and 15 male), who were selected randomly from the second semester. These participants ranged in age from 18 to 20 years.

### *2.3. Data collection tools*

This study has two instruments. The instruments used to identify the learning style of the student was a questionnaire, modified from the modality (learning channel preference) questionnaire produced by O'Brien (1985). The questionnaire consists of three sections which has 10 questions of VAK (visual, auditory and kinaesthetic) learning styles. Each question consisted of three choices of response which were 'Never applies to me', 'Sometimes applies to me' and 'Often applies to me'. Meanwhile, data on the learning outcomes were obtained from the language skills test in the intermediate class course.

Each answer selected in each section was given a score between 1 and 3, and for the type of modality, the choice of the highest score indicated the respondent's learning preferences. The highest score indicates the strength of the preference. Meanwhile, if respondents have relatively high scores in two or more sections, they are predicted to have more than one strength. If the score obtained is the same

in all sections, the respondent may not have a particular learning channel. They can be considered as multi-sensory learners.

#### *2.4. Data collection process*

The study begins by detecting the tendency of the learning style of the student based on the gender category. The student can choose the answer according to the conditions of how often it applies to her/him. Each answer will obtain a different score. Score 1 will be given to those who choose 'Never applies to me', score 2 will be given to those who choose 'Sometimes applies to me' and for those who choose 'Often applies to me', they will get the maximum score of 3. The sentences or statements in section one indicate the tendency of the visual learning style. The sentences or statements in section two indicate the tendency of the auditory learning style, while section three is the tendency of the kinaesthetic learning style.

The questionnaire had an answer key guide and could generally be completed by students within 30 minutes, without significant difficulty. The study was started with some explanation of how to fill out the questionnaire to prevent mistakes. The next step was taken after determining the tendency of students' preferences based on gender, and classified the student preferences for each learning style based on gender. The last step was finding out the relationship between the students' learning styles and the learning outcomes.

#### *2.5. Data analysis*

The students' answers were corrected based on the answer guide. Each statement item contains four choices of answers (V, A and K). Each section has a maximum of 10 points; if the student has all the maximum points in all sections, he or she can get a maximum of 30 points. The determination of learning style preferences was obtained from the type of modality that has the highest score – the higher the score, the stronger the preference. If the student has relatively high scores in two or more sections, they are most likely to have more than one potency. As for the opposite, should the sections' scores be roughly equal, they are most likely to not have a preferred learning style and are multi-sensory learners.

Based on the correction results of the 30 statements, the students' responses to each question and the total score for each choice of learning style are known. For example, student X has a score of 30 for section one (visual) and has only 10 for section two (auditory) and 20 for section three (kinaesthetic). It can be concluded that student X belongs to the visual learning style. Student Y has a score 20 for section one, 22 for section two and 23 for section three; she/he is probably a multi-sensory learner. The collected data were analysed by the Measures of Central Tendency Index to determine the different means of the learning styles between male and female students. However, the data related to the relationship between learning styles, gender and learning outcomes were analysed using the product-moment correlation formula.

### **3. Results**

This study aims to provide an overview of the trend of the German education study programme students' learning styles. More specifically, to give an idea of whether there are differences in the tendency of visual (V), auditory (A) and kinaesthetic (K) learning styles of male and female students, and a relationship between learning style, gender and learning outcomes. Based on the learning style's result analysis of the 30 students, there were generally differences in the learning styles of male and female students. In terms of standard deviation, male students were more likely to be auditory learners. At the

same time, female students preferred kinaesthetic and visual learning styles. This result is shown in Figure 1.

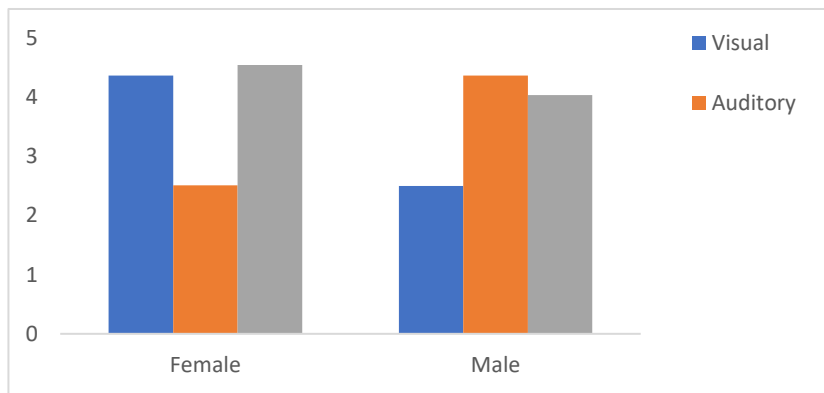


Figure 1. The tendency of students' learning style preferences according to gender

Statistically, Figure 1 shows the different tendencies of the learning style preferences of female and male students. The analysis of the standard deviation of women's learning styles for visual is 4.37, auditory is 2.51 and kinaesthetic learning style is 4.55. These results reflect that female students tend to respond better to kinaesthetic and visual learning styles. On the contrary, male students have an auditory learning style of 4.37, a kinaesthetic style of 4.04 and a visual style of 3.94. This means that in contrast to the female students, male students tend to respond better to auditory learning styles, followed by kinaesthetic and visual styles. Figure 2 shows the different preferences of male and female students for each learning style.

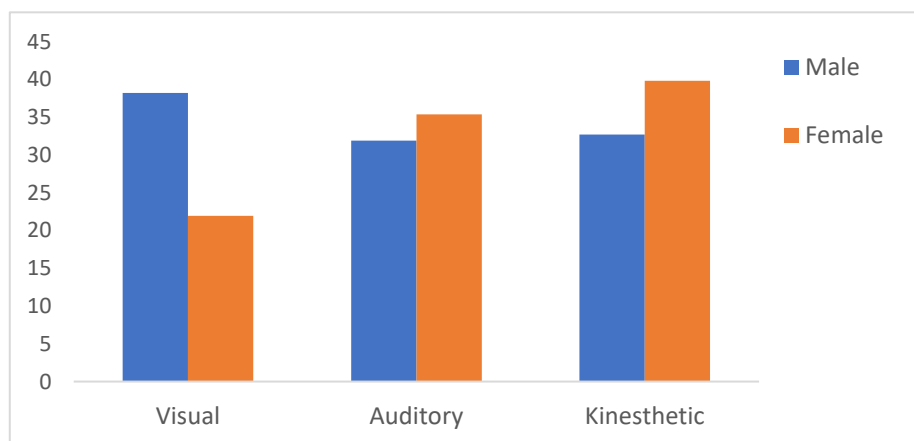


Figure 2. The students' preference tendencies according to learning style

Females dominated the kinaesthetic learning style with 39.81%, while males had 32.71%. On the other hand, although the frequency is not too different, visuals are also dominated by women with 38.23%, followed by males with 31.9%. Meanwhile, the auditory learning style is dominated by males (35.38%) and females (21.96%). These results illustrate that, in general, kinaesthetic and visual learning styles are preferred by females, while males prefer auditory learning styles.

Table 1 describes the relationship between learning styles, gender and learning outcomes. This study also examines the relationship between learning styles, gender and learning outcomes. Table 1 explains that, both individually and collectively, learning styles and gender have a significant relationship with learning outcomes. Individually, the relationship between male and female learning styles has almost the same correlation coefficient, with a significant level of alpha = 0.05 for males ( $r_{\text{count}} = 0.908 > 0.514 = r_{\text{table}}$ ) and female learning style ( $r_{\text{count}} = 0.949 > 0.514 = r$ ). Table 1 also illustrates that collectively, both variables, learning style and gender also have a significant relationship with learning outcomes, with a significant level of alpha = 0.05 ( $r_{\text{count}} = 0.826 > r_{\text{table}} = 0.361$ ). The analysis results explain that, overall, learning styles and gender have a positive and significant relationship with learning outcomes.

Table 1. Correlation between learning style, gender and learning outcomes

	Male		Female		Female + Male	
	Y	X1	Y	X1	Y	X1
Respondent (N)	15		15		30	
Total	1075	1563	1210	1620	2285	3189
Mean	71.67	104.20	80.67	108.00	76.17	106.30
Standard deviation	9.57	17.28	4.58	12.65	8.68	15.17
Varian	85.56	278.83	19.56	149.33	72.81	222.41
Median	70	114	80	110	80	112
Modus	70	80	80	120	80	120
Correlation	<b>0.908593</b>		<b>0.949918</b>		<b>0.826323</b>	

#### 4. Discussion

Statistically, the study results indicate that there are differences in learning styles between female and male students in the German Language Department overall. Female students tend to be kinaesthetic learners, while male students prefer the auditory learning style. This study shows that students with German majors are more likely to use more than one sensory learning style in accessing information during the learning process. The reason is that both women and men have other tendencies in collecting information in the learning process. It can be said that these two groups of students also tend to use other learning styles.

The argument related to this phenomenon is that the differences in learning styles between male and female students found in this study were not very significant. Women, for example, were dominant in kinaesthetic and visual learning styles, but there are still around 2.15% of the students who prefer auditory learning style. The same thing happened to male students. Although, in general, they prefer the auditory modality, some of them (around 4.04%) enjoy learning through kinaesthetic modalities, while the other 3.94% prefer visual styles. This happened because learning foreign languages, mainly German for communication, has used active and creative learning methods and techniques that allow students to use varied ways of capturing information.

The findings throughout this study are similar to those found by Wehrwein et al. (2007). They discovered that students, both girls and boys, may prefer one of the other modalities, and that unless particular attention is taken to present the subject matter in their chosen form, they may struggle to understand it. The study explains that learning preferences and learning achievement have a significant relationship. When someone is aware of their learning styles and uses them efficiently, learning achievement will increase. In line with that, Leasa et al.'s (2018) research also found that the majority of male students (58.8%) and female students (56.7%) in elementary school preferred kinaesthetic

learning style, followed by auditory and reading. The visual learning style is the least favoured learning style found in their research, among both male and female students.

Canpolat (2019), in his research, found that there is a relationship between academic self-efficacy and learning style. Research on students from physical and sports education schools suggests that learning materials should be taken from various sources, which aim to enrich the material itself and accommodate the perception of self-efficiency in the teaching and learning process. In addition to enriching teaching content through various sources, teachers during class also need to vary teaching methods, materials, and teaching and learning activities. This is also part of the effort to increase students' academic self-efficacy in the learning environment. However, Cohen (2003), cited by Uhrig (2015), found that an analytic learning style is one in which a person learns better individually and sets his own goals.

When someone is aware of the learning styles and uses them efficiently, learning achievement will increase. This diversity can be a challenge for teachers in preparing appropriate learning methods and strategies that directly impact student learning outcomes. The learning outcomes obtained are interactions between cognition (intelligence) and context (tasks). They explain that the influence of the learning style model provides a valuable synthesis between information processing theory and learning style/cognitive theory (Riding & Rayner, 2013).

Learning German as a foreign language today is student-oriented (student-centred learning), which means that teachers need to be aware of the individual differences of each student, especially in the acquisition and processing of knowledge. By realising this, teachers are expected to integrate various forms of teaching and learning activities into the classroom with appropriate learning methods. Teachers need to develop teaching approaches to meet all the learning needs of students, both male and female.

By understanding each student's learning style, lecturers can develop teaching strategies to maximise motivation and learning for students of both sexes. Christison (2003), cited by Wong and Nunan (2011), suggested that teachers audit their classroom practice to identify their preferred strategy. Teaching styles and learning styles have a relationship with each other. Christison described the relationship between the two as a coin with two different sides. Students can develop their learning style more broadly if the teacher also expands their teaching style. As explained earlier, every student has a different learning style. Therefore, by expanding teaching styles and arranging teaching strategies, teachers will be greatly facilitated in meeting the needs of each student's learning style.

To increase motivation, improve student performance and meet their preferred learning style, it is vital to update and adapt teaching methods and evaluate their efficacy (Norman, 2009; Malacapay, 2019). According to Ballweg et al. (2013), students focused on their needs. As we know that all learners are different, lessons must be designed to accommodate the individuality of learners in the classroom, including learners' special interests or their pace of learning. This means that not all students have to do the same thing in the lesson every time.

Brinitzer et al. (2016) also underlined several strategies related to these learning preferences. Teachers should be able to apply multi-sensory learning as much as possible and present the subject matter in various ways so that as many learning styles as possible can be applied. It is essential to offer all the senses and processing facilities. Teachers must determine approaches and learning strategies



that can accommodate student preferences without differentiating male and female students with their respective learning styles.

In the learning process, it is important to understand each style. Each learning style increases the student's level of success, especially when it is tailored to individual needs. Zapalska and Brozik (2006) found that student achievement can be improved by offering appropriate guidance to each student's learning style. If the teacher understands each student's learning style and applies it in the learning process, students will be more satisfied with the whole process, and in the end, learning outcomes will be better (Mohammadi et al., 2015). Alkhasawneh et al. (2008) also suggested that teachers adapt their teaching methods to suit their students' learning styles to optimise their learning opportunities.

Two learning strategies can be considered. The first is autonomous learning: the concept of autonomous learning represents the learner's ability to decide on his learning process design independently, implementation and evaluation and to be independent of teachers, teaching materials or teaching institutions. To achieve this goal, the use of learning strategies plays an important role. Learning strategies are essential components of autonomous learning and are the basis and instrument for independent learning. Lecturers must be able to provide appropriate learning strategies to empower students to develop their abilities to recognise, evaluate and make their learning paths effective. By providing better learning strategies, students become more independent and more independent in learning.

Tomasouw and Marantika (2019), based on the study results, concluded that learner independence is a learning strategy that can help improve the quality of students. However, in this study, from five aspects used as indicators, only two aspects according to the students had been implemented well. This will be effective if the instructor understands his role as a teacher by paying attention to his functions, such as (1) the teacher becoming less an instructor and more a facilitator; (2) students' capacity for self-study is encouraged; and (3) students are encouraged to develop their learning strategies.

The results of this study are significant because if students are more familiar with their learning strategies, they have the right to choose which one is best for them. Self-study will provide many benefits, such as building self-confidence and a sense of responsibility for what will be done. The results of this study are in line with the research reported by Broadbent and Poon (2015), cited by Marantika (2021), which found a significant positive correlation between academic achievement and the use of self-regulated strategies for learning. Students can achieve better academic performance when they are allowed to self-regulate and are explicitly taught autonomous learning strategies.

The second learning strategy is multi-sensory learning. This strategy increases the active participation of students in the learning process in the classroom. It increases students' understanding of the required skills, various media and methods that are combined when presenting lessons. Multi-sensory techniques can allow students to use their areas of strength to help them learn. This strategy is based on the fact that many senses are used to engage in active learning, and in turn better results will be achieved. Lecturers need to design learning activities that encourage students to use their senses more. They must see, hear, say and perform tasks to understand the information.

The discussion above illustrates that in learning German as a foreign language in heterogeneous classes and identifying students' backgrounds, especially learning styles and gender, have become essential. The teacher does not only make the identification. Students also need to be aware that the learning process must be able to know how to learn and their potential in learning. Recognising the conditions, especially learning styles, teachers and students can determine a more effective way of learning without feeling forced or forced to learn. Thus, both teachers and students can play an active

role in utilising and optimising their learning abilities. Teachers are required to evaluate their readiness and success in designing and facilitating student learning with the strategies they have made.

The results of this research and discussion indicate that students majoring in German are more likely to use more than one learning style in accessing information. This indicates that in designing learning, teachers need to study the tendency of students' dominant learning styles in the classroom. Based on the description above, kinaesthetic learning styles need to be maximised, followed by auditory and visual learning styles. This means that in determining learning strategies, forms of social interaction and forms of exercise, teachers are fixated on one learning style and need to take into account other learning styles based on the learning objectives to be achieved.

## 5. Conclusion

The results show that students' learning styles varied, for both male and female. Every learner had more than one learning style. The difference is how often he uses that learning style. This proves that gender and learning styles are two aspects that influence each other. When a person knows his weaknesses in learning, he will decide which learning style is suitable for him. As a result, achievement increases, self-confidence grows and learning attitudes will develop.

These results provide a forward-looking perspective through learning styles that are designed regarding the material and design of the learning process using appropriate learning strategies. This learning strategy must accommodate student preferences without distinguishing between male and female students with their respective learning styles. In addition, the differences in learning styles allow lecturers to use various teaching methods. These results also strongly indicate the influence of their German language skills and abilities.

## 6. Recommendations

Some suggestions related to the conclusion section are as follows: (1) it is necessary to conduct research that connects student learning styles with teacher teaching styles; (2) it is also necessary to disclose other factors that affect student learning outcomes, other than learning styles and gender; (3) lecturers or the teacher should design some related learning activities in the classroom to achieve better learning outcomes as these activities will allow students to develop their ideas creatively based on their needs, interests and learning styles; (4) lecturers or teachers can try to consider differences in learning preferences in the classroom as often as possible by choosing forms of social interaction and various forms of exercise according to learning objectives.

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