

Impact of Learning Styles on Higher Distance Learning

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This article aims to analyze the impact of learning styles on distance learning in higher education. This qualitative study is based on a literature review that comprehends students' styles as determining influencing factors in the teaching and learning process. It was carried out through electronic databases of ScienceDirect, Scopus and Web of Science. The literature review focused on articles that addressed impacts/implications of learning styles and relationship between learning styles and performance of learners. This study shows that distance learning affects education in a twofold way. On the one hand, the educational institutions are able to increase the enrollment rate and reduce school dropouts; on the other hand, students develop innovative and creative skills when higher distance learning is implemented in a student-centered perspective, associating teaching methods with learning styles. However, when methods and learning styles are incompatible, undesirable effects such as high retention of students in courses, dropping out of school and poor academic performance may follow.

Keywords: distance learning, teaching methods, learning styles, impact

INTRODUCTION

Distance Learning (DL) is a type of education that mostly takes place outside the traditional classrooms or away from the teacher, and a distance relation between a student and teacher is established in different materials and via a network (Cartelli, 2006). In this sense, it is very important that during the implementation of DL different means of communication and teaching methods combine with the students learning styles. In this regard, Kolb (1984); Mainemelis et al., (2002) claim that the learning process is significantly active when there is a direct relationship between Learning Styles (LS) and teaching methods. Within this line of reasoning, Dunn and Griggs (1995) also state that students perform better when teachers teach according to students' learning styles. Hence, the knowledge of the different learning styles is a crucial tool for teachers and higher education institutions at a distance.

Numerous studies have been conducted in the area of learning styles and teaching methods; however, these studies were focused mostly on the relationship between preferred LS and academic performance (Cartelli, 2006; Ford & Chen, 2001), and the relationship between LS and teaching methods (Mainemelis et al., (2002) in a campus-based learning. But very few attentions have been paid to the distance learning in which a student is responsible of his/her learning styles. The impact of LS has been relatively neglected,

even though, several problems are known to arise when there is lack of consideration of the preferences of students in the teaching and learning process (Cartelli, 2006).

In this context, this paper is trying to answer the following question: what are the impacts of learning styles in distance higher education when matching and mismatching with teaching styles? Considering the importance and complexity of the question, the paper intends to find all existing evidences of the distinct effects of learning styles by reviewing the literature.

LITERATURE REVIEW

The implementation of distance learning needs to meet students' characteristics and / or individualities. In this study, individualities refer to the sociodemographic, psychological characteristics and life situation of each person. However, within the scope of this study, the central focus of discussion and analysis will be only on psychological characteristics, particularly learning styles. Many psychological researchers have stated that one way of improving retention, learning process and outcomes is by paying attention to the student's needs or learning styles. According to Ribeiro (1999), the analysis of psychopedagogical assumptions finds its reason because the curriculum is implemented to a group of students with certain characteristics and needs.

Learning Styles

Learning is the process of acquiring new or changing existing knowledge, skills, attitudes or values. Everyone has a specific way of learning. The individual way of learning is called Learning Style (LS). According to Simonson et al., (2008), each individual is unique and needs to be recognized for those unique learning styles. When the individual is considered, characteristics such as attitude or interest, prior experiences, cognitive abilities, and learning styles will all have an impact. Peres and Pimenta (2016) also consider learning styles as determining factors in the teaching and learning process. For this reason, it is essential to discuss their impact on the higher distance learning.

According to Dunn and Dunn (1978), learning styles refer to conditions that favor the concentration, reception, processing and retention of information, as well as the acquisition and development of new or difficult skills. For Gregorc (1979), the LS are behavioral characteristics that indicate how the person learns from and adapts to his or her environment. From the concepts presented above, it is obvious that in order to satisfy the student's needs or goals in the process of teaching and learning, first, it is essential to know their characteristics or their different learning styles.

Apart from that, the research on learning styles can really contribute positive educational effects on the conduct of the teaching and learning process for both students and teachers. Sternberg (1997) states that a greater understanding of students on learning styles can favor self-knowledge, in order to instruct the decision-making processes about the course, the study methods to be adopted or the most appropriate strategies. According to Coffield, Moseley, Hall and Ecclestone (2004), a knowledge of learning styles can also be used to encourage a more self-aware reflection about strengths and weaknesses of students and tutors. In turn, Cartelli (2006) shows that the learning style information has been used as a source of adaptation in the educational systems.

Types of Learning Style

There are several terminological and conceptual terms regarding the classification of types of learning style. This statement can be justified by considering the Kolb's Theory (1984), Felder and Silverman's Model (1988) and Fleming's VARK Model (2001).

According to Kolb's theory (1984), learning is carried out in a cyclical way and it is characterized in four phases: 1) Concrete experience; 2) Reflective observation; 3) Abstract conceptualization, and 4) Active experimentation. Thus, this theory defends that when these steps are combined two by two, they form four learning styles: diverging; assimilating; converging and accommodating. According to Peres and Pimenta (2016), Kolb's learning cycle is based on the premise that each student receives and processes information in a unique way and at their own pace. Learning success thus is proportional to the approximation of the

teaching strategies to the individual learning preferences that, although not fixed, define the specific characteristics for each student.

The Model of Felder and Silverman (1988), defines the learning cycle as divided in four dimensions: perception; input; processing and understanding. Each dimension has eleven poles. In this perspective, in the dimension of perception, the individual is sensory or intuitive; during the input, he or she is visual or verbal; during the processing, he or she is active or reflective; and during the understanding, he or she is sequential or global.

The Model of Fleming (2001) explains that the person has four channels or learning styles, known as VARK. The acronym VARK stands for the following:

- 1) Visual (V) - the student with this style learns best through drawings, notes, diagrams, figures and visual demonstrations;
- 2) Aural (A) - the learning style of individuals who prefer listening and speaking;
- 3) Read/write (R) - the learning style of individuals who give preference to the information presented through words in the form of text, such as essays, articles, manuals and reports; and finally,
- 4) Kinesthetic (K) - the learning style of individuals who value physical or practical activities.

It is interesting to note that in this study three authors, each defending the existence of four dimensions or learning styles, have collaborated even though they classify learning styles in different ways. However, what we need to know here is that each student preferably has one dominant learning style.

The terms of learning styles denote several meanings, some associated with the sensory system and others associated with activities or techniques, which explains why there are no unique terms and definitions of learning styles. Despite the existence of some terminological and conceptual varieties in the definition and classification of learning styles, researchers and contemporary specialists in educational systems, substantially agree in maintaining that students learn differently. Though only three types of learning styles have been reviewed here, this paper will still take into consideration the effects of all types of learning styles.

It is generally believed that a student-centered approach satisfies students preferences or learning styles. So, when students realize that a particular teaching model is more up-to-date, and above all, when it is a student-centered learning model, they become very motivated and interested in becoming part of the educational system, consequently, the enrollment rate is high and school dropout is reduced. In fact, it becomes a much-desired model when the teaching strategies and means of communication are employed according to the needs or learning styles of each student (Simonson, et. al., 2008).

According to Ribeiro (1999), the student-centered learning model is based on the principle that the components of the curriculum must be established according to the immediate needs and interests of students who develop and learn through interaction and active involvement with their environment. Apart from that, the selection and organization of the objectives, contents and teaching-learning activities move within the purposes of promoting the intrinsic motivation, personality or individual development of the student, according to his/her own rhythms, making him autonomous in the learning process and offering resources for his/her socialization.

Almeida and Silva (2011) affirm that the adoption of the student-centered teaching conception must be the one that satisfies the student's preferences, and with respect to the pace of each student. In fact, when implementing the higher distance learning, it is very important to take into account the learning styles of every student, since meaningful learning or effective participation depends mainly on the ability of each individual. Hence, the use of learning styles as a source of adaptation of the student-centered teaching model is seen as a guarantee of student involvement in the process of teaching and learning, creativity, innovation and the success of the distance learning modality.

However, it is also important to underline that different studies also claim that individuals are not born with learning styles, but rather, they learn throughout their lives. Bearing in mind that the LS of each individual can change over time, then it would be neither reasonable nor prudent, nor academic transformation to define only teaching methods that do not challenge the abilities of students, knowing that students can adapt to every teaching and learning environments. Moreover, different studies have shown

that matching learning styles and teaching has no significant effects on students' performance (Lu et al., 2002; Gohara & Sadeghi, 2015; Haider et al., 2010; Liew et al., 2015; Dinçol et al., 2011).

In addition, Friedberg (1993), quoted by Viseu (2003), draws attention that students are considered as active actors who modify and adapt to the action contexts in which they operate. Thus, students are able to leave their preferences, and adopt new habits to succeed in the teaching and learning process. This is one of the reasons why other people believe that the process of acquiring and developing skills does not occur in a linear way.

Different researchers argue that the use of learning styles as a source of adaptation of teaching model is not the best strategy. They defend that students need to be stretched to learn. In this context, stretching refers to deliberate mismatching the learning styles and the teaching methods (Grasha, 1984). So, the implementation of a stretch and challenge model or mismatching learning styles and teaching styles is recommended. In this premise, Cartelli (2006) advocates that deliberate mismatching (challenging) is sometimes desirable for students to be exposed to multiple alternative teaching-learning strategies for their own benefits. In the view of Felder & Silverman (1988), mismatching teaching styles and learning styles can cause boredom and demotivation, consequently, students can have poor learning performance.

Because of these different opinions and arguments, it can be assumed that many school administrators and even some researchers are unaware of the impact of learning styles on education. Apparently, this is the reason why some distance learning institutions continue implementing global or generic models that do not offer individualized learning. And some teachers may probably face a dilemma, whether to match or mismatch teaching styles with learning styles. Even Coffield, et al., (2004) acknowledge that "the evidence from the empirical studies is equivocal at best and deeply contradictory at worst".

Even if the idea of learning styles is not fully accepted by some individuals, but it is completely believed that this subject is of paramount importance to discuss and analyze here because learning styles are part of characteristics of students who influence the stages of course development and in the elaboration of the lesson plan and assessment. In addition, Coffield, et al., (2004), state that a knowledge of learning styles can be used to increase the self-awareness of students and tutors about their strengths and weaknesses as learners. The self-awareness may lead to more organized and effective approaches to teaching and learning. The self-awareness of students and teachers is known in the literature as metacognition. Students with developed metacognitive abilities can take full ownership of their learning, manipulate the learning strategy to best suit their learning styles and they can be expected to be more adaptive to changes in the environment (Cartelli, 2006). Indeed, the current subject of discussion on learning styles is also important to curriculum development experts because the curricula for adults are defined based on the individual characteristics, needs and abilities (Castro, et al., 2006).

Teaching Methods

According to Libâneo (1994), teaching methods are actions that regulate the forms of interaction between teaching and learning, thus, between the teacher and the students. The selection of methods depends on the specific contents and on the characteristics of the students, regarding their age, level of mental and physical development and socio-cultural. In this respect, attention is drawn here to the fact that an incompatibility between the methods and the real conditions of students, such as learning styles, can result in undesirable effects.

Teaching methods have been classified in several ways, according to different criteria. In light of this premise, Ribeiro (1999) classifies teaching methods in three types, namely: exposure, group discussion/debate and inquiry. For Libâneo (1994), the teaching methods are: exposure by teachers, independent work of the student and group work.

The choice of a particular teaching method is crucially important. The methods should not be chosen at random or in the interest of the teacher, but rather on the basis of each student's abilities, certainly, taking into account the complexity of the content and teaching objectives (Ribeiro, 1999). In order to make sure that the methods being used satisfy the students, it is first necessary to identify their learning styles. Therefore, it is advisable to carry out a questionnaire survey or observational research during the learning process (Graf, Kinshuk & Liu, 2009).

For example, an expository method is a quick and easy way for the distance learning modality to transmit a vast set of information or knowledge in a short time and for many people. However, when a teacher chooses this method, for example, for a learning objective that necessarily requires a practical activity and at the same time, it is applied to a student with a kinesthetic style, it is expected to create some undesirable effects. In this regard, the expository method is not suitable for a practical activity that requires the student to develop very complex skills or abilities (Ribeiro, 1999). If the situation presented above occurs in one of the teaching programs, it may be more clear evidence of non-compliance with the teaching objective and total loss of time. Moreover, it can cause disinterest and demotivation among kinesthetic students in learning, consequently, low pedagogical performance.

Continuing with the same example, the literature states that the student with a kinesthetic style is an individual who learns better by doing, instead of seeing or hearing others acting. For this student, learning is usually facilitated by carrying out practical activities, that is, he/she has good performances in experimentation or laboratory experiments, demonstrations, role-plays, and any other activity that facilitates the movement of the body. In this perspective, the expository method can be a great obstacle and a threat to the kinesthetic student in the process of acquiring knowledge and skills.

Given this scenario, if a teacher applies a teaching method that is not compatible with the learning style of each one, it is believed that several consequences may arise. The student may lose interest in participating in pedagogical activities, and face the doubts concerning his or her ability to carry out a practical activity individually. Practically, the student who finds himself/herself in this negative learning climate or situation loses his/her confidence or motivation (Castro, et. al., 2006).

The lack of self-confidence in oneself can cause a feeling of being helpless, impotent, incompetent and inoperative. All of this can still develop depression, anxiety and lack of motivation to learn, subsequently, low academic performance. When pedagogical performance remains very low, this can further lead the student to take a decision to drop out of school. Likewise, several unwanted effects can arise when a teacher decides to apply the independent working method to a student with an auditory style. Therefore, it is very important that this issue needs to be taken seriously by teachers, researchers, curriculum designers and school administrators.

Among several justifications that may exist in pedagogical practices, even if the school or university has excellent infrastructures and a qualified teaching staff (a positive learning climate), it will not have good pedagogical results if the student himself/herself is not motivated to participate (Castro, et. al., 2006) or search for knowledge. Obviously, the teaching and learning process takes place effectively when there is motivation and interest on the part of the student. Therefore, the greater the motivation to learn, the greater the willingness to study. In this sense, the student's motivation is a fundamental factor in determining success in learning. As previously stated, the best technique of promoting intrinsic motivation is implementing a student-centered learning model that satisfies the students' needs, preferences or learning styles. In this premise, Cartelli (2006) advocates that the student's academic performance is improved when the learning environment and teaching methods are modified to suit the various learning styles.

RESEARCH METHOD

As previously reported, the student's learning outcomes are improved when the learning environment and teaching methods are modified to suit the various learning styles. Therefore, to provide the actual impacts of learning styles in distance higher education when matching and mismatching with teaching styles, we chose a literature review method. In this context, this paper is trying to answer the following research questions: 1) What are the impacts of learning styles in distance higher education when matching with teaching methods? 2) What are the impacts of learning styles in distance higher education when mismatching with teaching methods?

Considering the importance and complexity of the questions, the paper intends to find existing significant evidences of the distinct effects of learning styles by reviewing the literature. Despite the existence of much research on distance learning, there is a great lack of studies on the impact of learning styles in distance learning. The relevance of this article is justified in the educational perspectives. This

paper may contribute to the debate on the impact of different learning styles. The conclusions of this paper may also help in the selection of teaching methods of distance learning.

DATA COLLECTION

This process of gathering and measuring information on impact of learning styles on distance learning in higher education was based on a systematic research. It was carried out through electronic databases of ScienceDirect, Scopus and Web of Science. In these databases were found scientific articles, thesis, monographies and books. But after applying the inclusion and exclusion criteria, only articles and books were selected because they were considered highly reliable and relevant to the present paper. The keywords used in searching the articles and books were in English and Portuguese languages, and the main search criterion applied was the presence of the following words in the title: impact/implication of learning styles and, learning styles and teaching methods, including their synonyms. The total number of articles and books found were 83. After applying the selection criteria, the number was reduced to 42.

The selection process of articles and books started by reading titles, abstracts, methods and conclusion. They were finally selected based on the following criteria:

- 1) Accuracy: focusing on the articles and books that showed the results of matching/mismatching learning styles and teaching methods.
- 2) Relevance: focusing on articles and books related directly to distance education or blended learning and, considering their objectives.
- 3) Clarity: focusing on clear empirical findings and taking into consideration the methods used.

DATA ANALYSIS

Data analysis is a process of systematically reducing large amounts of collected data with objectives of discovering useful information for interpretation and decision-making. In this article, data were analyzed on an ongoing basis. Data categorizations were created, and constant comparison was also used which is appropriate method of data analysis that takes place in qualitative research (Kawulich, 2004). Categorization was formed by asking questions about data and, making constant comparison for similarities and differences between study conclusions. Then, similarities were grouped in one category for decision-making or conclusion.

The selected articles are briefly described in the present paper according to their objectives, methods and results. And the findings from different researches are classified into two large categories, namely, learning styles as influential factors and uninfluential factors. In this paper, all articles or findings that show effects or relationship between learning styles, performance and teaching methods belong to a category called influential factors, while those articles that do not show any effect or relationship belong to a category called uninfluential factors.

RESULTS

Many researchers have carried out different studies to find out the implication of different preferred learning styles on students' performance (Thomas et al., 2002), but very few studies support the existence of the relationship between learning styles and teaching styles. Among selected articles of this paper, 6 of 42 concluded that there is no relationship between learning styles, performance and teaching methods (Lu et al., 2002; Gohara & Sadeghi, 2015; Haider et al., 2010; Liewl et al., 2015; Dinçol et al., 2011). Therefore, these findings belong to a category of uninfluential factors.

Lu, et al., (2002) developed a study titled, "Learning style, learning patterns, and learning performance in a Web Course Tools (WebCT) based Management Information Systems (MIS) course", with an objective of identifying the impact of student learning styles, learning patterns, and other selected factors on their learning performance. The study was empirical and exploratory. According to these authors, the questionnaire was designed to get input on 15 questions from each student registered in the Web-based MIS

classes. Their results suggested that learning styles do not influence the student's performance, and students are able to learn equally well in WebCT online courses.

Haider, et al. (2010) designed a study titled "An investigation of relationship between learning styles and performance of learners". They aimed to investigate the relationship between learning styles and performance of learners in online quizzes. They concluded that significant number of academic deficient learners is not inclined towards a specific learning style. In other words, difference in learning styles does not affect performance of learners. Liew1, et al. (2015) carried out a similar investigation. But the survey instrument used in their study was the VARK questionnaire. The results showed that the learning styles preferences do not contribute significantly to the learning outcomes. Byrne and Lyons (2001) also reported that no significant conclusions could be drawn from their study of learning styles. These authors still noted that at various moments, weak evidence of a relationship and impact on academic performance has been found.

Dinçol, et al. (2011) developed a study entitled "The effect of matching learning styles with teaching styles on success". This study aimed to examine the effects of matching between the learning styles and the teaching styles. According to the authors, the Grasha-Riechmann Learning Style Inventory/Scale was applied to the learners and teachers. This study concluded that matching learning styles with teaching styles has no significant effect on the success of the learners.

Gohara, & Sadeghi (2015) carried out another investigation entitled, "The impact of learning style preferences on foreign language achievement: A case study of Iranian EFL Students". The intention of this investigation was to explore whether the learning styles could have an impact on students' foreign language achievement. The survey instrument used in this study was the Kolb's Learning Styles Inventory. The findings indicated that the learning styles has no significant influence or impact on student's achievement.

Nonetheless, there are empirical evidences from various researches that show the existence of significant relationship between learning styles, performance and teaching methods (Gee, 1990; Du & Simpson, 2002; Hayes & Allinson, 1996; İlçin et al., 2018; O'Leary & Stewart, 2012; Damrongpanit. & Reungragu, 2013; Awla, H.A., 2014; Peacock, 2001; Zhou, 2011; Kara, 2009). So, for the sake of clarity and easy understanding, the findings of this category (influential factors) are divided into two subcategories, namely: negative effects and positive effects of learning styles.

Positive Effects of Learning Styles

In this study, the positive effects of learning styles refer to desirable results or aspects obtained by practicing good teaching policies and strategies. Several studies defend that the achievement of desirable aspects depends on the quality of the teaching model (Duffy e Kirkley, 2004), and the existence of a positive organizational climate (Cartelli, 2006), or a positive learning climate (Castro, et. al., 2006). But the conclusion or definition of the present category is based on the findings of the relations among two main constructs: learning styles and teaching methods.

It is generally believed that learning styles are determining factors in the teaching and learning process (Peres & Pimenta, 2016). That is why it is assumed that when the learning styles do match with the format of teaching styles could be beneficial to students. Some of the benefits are learning process becomes easier, faster and more successful, and learners' confidence is increased (Awla, 2014), and significant effects on academic performance or learning outcomes can be reported (Ford & Chen, 2001).

Several researchers have been more interested in investigating the positive effects of matching learning styles and teaching styles. More evidences from empirical studies have been published and have provided some indication of support for the hypothesis that matching learning styles and teaching styles would increase students' academic achievements (Damrongpanit & Reungragu, 2013; Gee, 1990), improve learning performance (Hayes & Allinson, 1996; İlçin et al., 2018; O'Leary & Stewart, 2012), and increase student's enjoyment level of the distance learning (Du & Simpson, 2002).

If it is believed that the good implementation of the distance learning is based on the student's characteristics, then it is undoubtedly to say that more negative effects can also occur when there is incompatibility between distance learning model and students' characteristics, especially, learning styles. So, it is very important to present different negative effects of learning styles.

Negative Effects of Learning Styles

In this article, the negative effects of learning styles refer to undesirable results or aspects obtained by employing bad teaching policies and practices, and sometimes lack of consideration of students' characteristics and abilities in the teaching and learning process. Teachers are, therefore, recommended to overcome the effects of learning styles by teaching in a balanced style in order to accommodate different learning styles (Peacock, 2001).

There have also been numerous studies investigating the negative effects of mismatching between learning styles and teaching styles. Peacock (2001) carried out a research entitled "Match or mismatch? - Learning styles and teaching styles in EFL". This research investigated Reid's (1987) hypothesis that a mismatch between teaching and learning styles causes learning failure, frustration and demotivation. According to the author, data were collected through Reid's questionnaire, and interviews at a Hong Kong university. The findings from questionnaire indicated that learning styles and teaching styles were mismatching. The results from interviews revealed that the mismatching caused frustration and demotivation, consequently, the student's learning was often affected seriously. Many researchers also believe that an incompatibility between learning styles and teaching styles can lead to serious consequences, such as poor teaching outcomes, low retention of students on courses (Felder & Silverman, 1988), and poor academic performance (Cartelli, 2006).

Zhou (2011) conducted a study titled "Learning styles and teaching styles in college English teaching". This study concluded that "mismatching may be appropriate so that students' experiences help them to learn in new ways and to bring into play ways of thinking and aspects of the self not previously developed. Any mismatching, however, should be done with sensitivity and consideration for students, because the experience of discontinuity can be very threatening particularly when students are weak". The same author recommends "teachers to know their learners' preferred learning styles because this knowledge will help teachers to plan their lessons to match or adapt their teaching and to provide the most appropriate and meaningful activities or tasks to suit a particular learner group at different stages". Another similar investigation, carried out by Kara (2009), was titled "Learning Styles and Teaching Styles: A Case Study in Foreign Language Classroom". The findings of this investigations showed that the learners felt unhappy and frustrated when the teaching styles did not match the learning styles.

Coffield, et al., (2004) developed a very rigorous report entitled "Learning Styles and Pedagogy in Post-16 Learning: A Systematic and Critical Review". According to these authors, this critical report reviewed the literature on learning styles and examined in detail 13 of the most influential models systematically. This report concluded that "it matters fundamentally which instruments is chosen. The implications for teaching and learning are serious and should be of concern to learners, teachers and trainers, managers, researchers and inspectors".

DISCUSSION

Taking into account all findings reported by various researchers in this article, it is clear that there are several different opinions regarding the impact of learning styles on the teaching and learning process. It is so because, historically, the pedagogical positions have never been unanimous or homogeneous. Despite different points of view in relation to the effects of learning styles, still, there are strong recent empirical evidences that support the existence of the relationship between Learning Styles (LS) and Teaching Styles (TS).

However, the relationship between distance education and learning styles is not well discussed in different researches. Thus, most of the researches that reject the impact of learning styles on the teaching and learning process have limitations by not considering the following factors in their studies:

- ❖ Age – Most of the students who attend distance education are adults (Fazenda & Amadeu, 1985). The characteristics of adults are very complex. According to Peres e Pimenta (2016), adults generally present lots difficulties in using electronic tools. This is the reason why they need to be attended in a special way. Even though, the majority of distance education studies have ignored how adult students' learning style characteristics may differently affect their

educational experiences (Gee, 1990), age is considered as the important factor in the teaching and learning process.

- ❖ Instructional technology - Distance education has changed dramatically in terms of course design. The courses or subjects that were offered in an on-campus, nowadays are offered online using different instructional technologies or electronic tools, such as: mobile, television, skype, Web pages, e-mail, chat rooms, and videoconference. Some of these teaching tools, especially email, television, Web pages can promote impersonal atmosphere, which can be a big problem to aural style students or other learning styles. In this sense, it is vital to use technology tools that correspond to the characteristics of each student. Another limitation exists in measuring the patterns of learning in electronic tools or Web course tools (Lu, et al., 2002). In this sense, ignoring the instructional technology as an important variable in the studies can be considered as a limitation.
- ❖ Assessment variety – The identification of the participant’s learning styles in some researches is based on self-assessed and not subject to any validated instrument which could have more accurately determined their actual style (O’Leary & Stewart, 2012; İlçin et al., 2018; Smith & Dalton, 2005). This technique is not 100% accurate because some students would have difficulty in identifying their actual learning style or else not taking this issue very seriously. And culturally, others would be afraid of saying directly that their teachers’ teaching styles do not match with their learning styles.
- ❖ Sample – The sample size of some studies is relatively small (Lu, et al., 2002). And moreover, adults and young may not have the same impacts when learning styles and teaching methods do not match. Therefore, unclear definition of the sample type and size can also be considered as a limitation.

The limitations mentioned above can influence the findings significantly. Therefore, the conclusions of these studies that there is no relationship or impact between teaching methods and learning styles need to be analyzed deeply. This paper supports the compatibility of Teacher Delivery Styles (TDS) and Student Learning Styles (SLS). In this sense, a match between TDS and SLS contributes to the positive pedagogical achievements of the students (see the Table 1 below). While a mismatch may lead to a failure in the learning process (see the Table 2 below).

TABLE 1
EFFECTS OF MATCHING LEARNING STYLES WITH TEACHING STYLES

Authors	Effects of Matching
Awla (2014);	- Learning process is easier and faster - Learners increase confidence
Hayes & Allinson (1996); İlçin et al. (2018); O’Leary & Stewart (2012);	- Learners improve learning performance
Damrongpanit & Reungtragu (2013); Gee (1990)	- Learners increase academic achievements or outcome
Du & Simpson (2002)	- Increase student’s enjoyment
Cartelli (2006); Ford & Chen (2001); Dunn et at. (2002); Naimiea et al. (2010)	- Performance yielded significantly higher - Improve students’ achievement
Pask (1976)	- Favours learning

TABLE 2
EFFECTS OF MISMATCHING LEARNING STYLES WITH TEACHING STYLES

Authors	Effects of mismatching	Effects of deliberate mismatching
Peacock (2001); Kara (2009)	- Learning failure - Frustration - Demotivation	
Felder and Silverman (1988)	- Poor teaching outcomes - Low retention of students	
Cartelli (2006); Ford & Chen (2001); Dunn et al. (2002); Naimie et al. (2010)	- Poor academic performance	
Zhou (2011); Grasha (1984)	- Learners become frightened	- Learn new ways - Increase thinking capacity - Personal progress and creativity
Pask (1976)	- Disrupts learning	
O’Leary & Stewart (2012)	- Usefulness deteriorated significantly	

Considering an international initiative of “education for all”, then it is evident that an on-campus learning modality has lots of limitations or failed to bring the benefits of education to every student. Especially, when a classroom has different students’ characteristics or students with disabilities. For example: vision impairment, deaf, blind, leprosy cured persons, etc. In this perspective, it can be hard for a teacher of an on-campus education to satisfy the needs of the class with different learning styles, particularly, when using traditional teaching methods. It is believed that the only flexible modality that can realize the aim of “education for all” is the distance education, specially the blended-learning model, which involves a blend of face-to-face classroom and online instruction. Importantly, the distance education has various teaching tools that focus on an individual student. So, the nature of the blended-learning and its different teaching method may satisfy student’s needs or preferences. But the great limitation of the online learning is the use of technology that not all students can afford to obtain, such as laptop, computer, Internet and some software.

Assuming that the distance learning classes consist of different students’ characteristics or students with disabilities and working adults with considerable commitments and time constraints, then, the application of different and appropriate teaching techniques is highly recommended. In this perspective, to avoid negative implications, the following steps and strategies should be taken:

- ❖ identifying the learning styles of the students (Cartelli, 2006);
- ❖ trying to understand the different ways of learning (Claxton & Murrell, 1987);
- ❖ providing more effective teaching approaches and support that are adjusted to the characteristics of the students (Claxton and Murrell, 1987) or that cater for individual learning styles (Cartelli, 2006);
- ❖ conducting research that seeks to relate the students' achievements to their learning styles (Pungente, Wasan & Moffett, 2002).

Synoptically, 34 of the 42 studies reviewed support for the hypothesis that matching learning style with teaching styles has positive effects on learning performance, while others advocate that mismatching learning styles and teaching styles has negative effects in the learning process. Therefore, it can be asserted that only those educational institutions that implement the student-centered learning model and, consider the learning styles as determining influencing factors in the course designing and lessons planning can benefit from the desirable effects presented above. However, the institution that executes the authoritarian teaching model does not exempt it from undesirable consequences or effects that have been reported in this

paper. In this perspective, it is recommended once again that distance learning model need to meet the sociodemographic, psychological and life situation of each student.

This paper has the following considerable limitations:

- ❖ most of the findings found were from on campus education modality;
- ❖ the literature review has relied on a relatively limited number of databases, consequently, very small number of articles was analyzed;
- ❖ the selection of studies for inclusion was based on quality criteria.

CONCLUSION

Though the impacts of learning styles have been relatively neglected by some researchers, serious problems or implications have been reported to arise when there is lack of consideration of the preferences of students in the teaching and learning process. Considering that the distance learning classes consist of different students' characteristics or students with disabilities and working adults with considerable commitments and time constraints, it is vital to pay attention to the students learning styles.

This article may have educational effects on the conduct of the teaching-learning process for both students and teachers. Thus, it tries indispensably to appeal to teachers not to teach the way they would like to learn, that is, following their learning styles, but rather the students' styles.

This article is also noteworthy that in the student-centered teaching model, specifically distance learning, one should not employ a method that conceives the teacher as the owner of knowledge and the student as a mere recipient of knowledge, under penalty to make it incoherent. It is also recommended that teaching methods should be in line with the student's characteristics, especially learning styles. Hence, teachers are called upon to understand the different forms of learning and to employ diverse methods in their classes.

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