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The Learning Styles of Technical Students and Their Role in Learning English as a Foreign Language

Abstract

The paper presents the results of mixed-methods research into the English language learning styles of a sample group of students from the Faculty of Electrical Engineering and Communication (FEEC) of the Brno University of Technology (BUT). In the quantitative phase of the research, students were questioned using an adapted Ehrman and Leaver Questionnaire (2003) with a bipolar scale of ten learning styles to identify commonly shared dimensions of learning styles of English among the sample group. The questionnaire also determined how flexible or rigid students were in their preferences and identified students with strong preferences for particular dimensions. The research then moved to a qualitative phase in which selected students who had stated a preference for commonly shared learning styles in the questionnaire were asked to participate in a semi-structured interview in which they discussed how their learning styles are reflected in their experiences of learning English and evaluated the success of their chosen approaches. Students were also asked about their willingness to change their learning styles if they had failed to make progress. The interviews offered valuable insight into students' learning preferences, with most students showing rigidity in their learning styles.

Keywords: language learning styles, learner autonomy, individual differences, styles stretching

Background and Motivation of the Research

The study examines how students at a Czech technical university learn English in an effort to address some of the issues which the author identi-

fied during her personal experiences of teaching at the Faculty of Electrical Engineering (FEEC) of the Brno University of Technology (BUT). Regardless of their level of English, the author observed that many students exhibited high levels of communication apprehension and a general unwillingness to communicate in addition to low accuracy levels in terms of grammar and vocabulary usage. More significantly, however, many students showed little motivation to improve their language skills, possibly as a result of previous failed attempts to make progress. Students also suffered from a low capacity for autonomous learning, with many unable to analyse their mistakes and learn from them; many seemed to prefer a limited range of learning approaches and were reluctant to explore other possibilities. These observations motivated the author to explore learning preferences of students in more detail and to determine the effectiveness of their chosen methods.

The research presented here aims to reflect the findings in teaching methodology and to tailor pedagogical approaches towards this type of student accordingly. Technical students are generally required to excel in logic and show an intuitive grasp of theory and procedural processes, with study programs placing a greater focus on abstract thinking and analysis. Given this academic background, it would be expected that technical students would apply a similar approach to the task of learning languages the same way but, as the results of our research revealed, the opposite is the case; students prefer learning languages in an intuitive and subconscious manner without placing a particular focus on grammatical rules. According to the Scopus database, no research has been carried out into the issue of the language learning approaches of technical students in the Czech context, and this indicates that there is a considerable research gap in this field.

Introduction to Learning Styles

Learning styles form an inherent part of the approach of individual learner differences. If learners have an awareness of the style of learning which suits them best; they can manage and guide their learning process more consciously and efficiently and can also be more motivated to study as they take more responsibility for what and how they learn. This approach of self-directing their study processes can help students to develop and strengthen their capacity for autonomous learning.

Learning styles have been the subject of considerable research over the course of several decades, but conclusions on their efficacy have been mixed. They were initially considered to be one of the key factors in determining

whether or not students were successful in acquiring new language skills, and were generally believed to be crucial in overcoming the false beginner phase and mastering a language. Proponents of this theory argued that if teachers found out how their students preferred to learn and they adjusted their teaching styles accordingly, the majority of students would benefit greatly, with the learning process becoming easier, faster, more enjoyable and more efficient, thereby ensuring tangible progress. However, much of the research behind this belief proved to be flawed in many cases, and subsequent studies on the issue split into a variety of different approaches with varying degrees of scientific rigour and reliability. The search for the "ideal" inventory of learning styles can perhaps be compared to the search for the "ideal method of teaching"; methods which had once been feted as the most suitable were soon superseded by newly developed models which were themselves replaced in turn by the latest attempt to find the "Holy Grail" of the ultimate methodology. After a period of harsh criticism (in many cases, deservedly so) in which the very concept of learning styles was brought into question due to the lack of thorough methodology and poor research results (see Pashler et al., 2008; Kirschner & van Merriënboer, 2013; or Geake, 2008), a more diligent approach to the topic was adopted which led to a cautious renewal of interest in learning styles. The pendulum of the unpopularity of learning styles had already reached its trough and more recent research appears to have regained some scientifically convincing confidence in openly admitting past flaws and genuinely searching for methods which emphasise reliability rather than novelty.

Definition of the Term

A plethora of definitions for learning styles have been offered since the emergence of the term, with most covering the above-mentioned fields of research and focusing on differences related to the personalities and cognitive abilities of individual learners (Ehrman & Leaver, 2003), variables in learning and teaching (Kolb, 1976; Entwistle, 1981), or personal and social behaviour (Sternberg, 1996; Rayner & Riding, 1997; see also Rayner, 2015). Reid uses general terms to describe the concept as "an individual's natural, habitual and preferred way(s) of absorbing, processing and retaining new information and skills" (Reid, 1995, p. 8), while Dörnyei (2005) notes that "[learning styles] are not firmly fixed ways of behaviour, but just tendencies and preferences more or less strong, which can be modified and extended according to various tasks and situations" (Dörnyei, 2005, p. 158). As Dunn and Dunn stated, "[l]earning style is a biologically and developmentally imposed set of characteristics that make the same teaching method wonderful for some and terrible for others" (Dunn & Dunn, 1979, p. 3).

> Learning styles are not dichotomous (black or white, present or absent). Learning styles generally operate on a continuum or multiple, intersecting continua. For example, a person might be more extroverted than introverted, more closure-oriented than open, or equally visual and auditory but with lesser kinesthetic and tactile involvement. Few, if any, people could be classified as having all or nothing in any of these categories. (Ehrman, 1996, p. 115)

The wide-ranging nature of these definitions reflects the vagueness of the term and also indicates the difficulties involved in approaching the topic. It also suggests a possible reason why research into learning styles has split into several directions since the period of critical revisionism.

Current State of Research

Rayner (2015) categorised research on learning styles into four types, and we can generally state that this categorization is still valid today. The first type examines personality-based styles, based on the premise that learning styles are closely related to personality traits; many current studies combine this approach with specific personality inventory tools, such as the Myers-Briggs Type Indicator (Myers-Briggs, 1978) or Big Five (Costa & McCrae, 1992; see Komarraju et al., 2011; Siddiquei & Khalid, 2018; Khamal & Radhakrishnan, 2019; or Abuzeid et al., 2021). The second type focuses on cognition-centred styles, a field which Rayner sees as relatively stable as such studies are related to mental processing, memory and differences in perception (see Ubuz & Aydynier, 2019; Wang & Sanchez, 2022; Miller et al., 2011). This paper follows this particular approach, as do many other authors focusing on the issue of technical students learning English (see Synekop, 2020 or Nikolaeva & Synekop, 2020). The third type is a less stable field, as it relates cognitive styles relating to tasks and changing contexts, an approach which is perhaps closer to the concept of learning strategies or patterns. Recent studies have linked this type of style to, among others, contextually-determined cultural background (see Lemke-Westcott & Johnson, 2013; Armstrong & Li, 2017). The final type in Rayner's categorization is that of learning preferences affected by modality and learning experiences (e.g., see Lodge, Hansen, & Cottrell, 2015).

The COVID pandemic radically transformed the entire education sector and forced teachers to work under new and unprecedented conditions. The need to switch almost overnight to online learning methods forced teachers to adopt new approaches. Materials and modules for e-learning materials and modules existed prior to the pandemic, but they were not widely used, nor were they considered as a primary source of teaching. As a result, e-learning materials were designed with a greater focus on individual learning styles or personality

types (or a combination of both) in order to compensate for the lack of personal contact and the more individual nature of online teaching, and this specific approach became the subject of a relatively new type of study which examines the efficiency and quality of such materials and online learning experiences in general (see Scott-Monkhouse, 2023; Samonte et al., 2023; Alzain, 2022).

Research in the Czech Republic

There is a relative lack of research examining learning styles in the Czech context, but the studies published to date mostly address the design of e-learning materials for foreign language instruction in distance studies (e.g., Šimonová, 2013; Šimonová & Poulová, 2012), while others focus on learning styles in science subjects such as physics, accounting and natural sciences (see Zajacová, 2016; Berková et al., 2020; Malčik & Miklošíková, 2017). The Scopus database suggests that there are currently no other Czech studies that focus on learning styles intended to improve language acquisition among students of technically oriented subjects.

Autonomy of Teachers and Students

Many different aspects seem to play a role in learning, and teachers should always acknowledge the fact that students are individuals with different abilities, skills, potential and motivation. Individual differences (ID) are thus a crucial consideration in formulating teaching strategies as they are explicitly reflected in the ways in which students learn.

"ID constructs refer to dimensions of enduring personal characteristics that are assumed to apply to everybody and on which people differ by degree" (Dörnyei, 2005, p. 4). "It is related to some main processes in the field of second language acquisition (SLA), and it has been researched extensively in L2 studies, making the area one of the most thoroughly studied psychological aspects of SLA" (Dörnyei, 2005, p. 6). According to Simsek (2012),

> individual differences can be defined as personal characteristics that distinguish learners from each other in the teaching and learning processes. Learners are unique individuals who bring a critical set of variables to each learning situation, including delicate traits as indicators of their potential and the history of achievement as signs of previous accomplishments and predictors of future performance. (Simsek, 2012, p. 98)

A recognition of the differences between students is important in ensuring that they develop the skills to master their chosen discipline and to understand the techniques which are most effective for them; the aim should be to allow students to gain autonomy and gradually develop into fully independent learners. Holec (2000, p. 48), one of the earliest advocates of autonomy in language teaching, has defined autonomy as "the ability to take charge of one's learning," while Dickinson (1987, cited in Gardner & Miller, 1996, p. 6) accepts the definition of autonomy as a "situation in which the learner is responsible for all of the decisions concerned with his or her learning and the implementation of those decisions." These definitions of autonomy generally agree on the involvement of learners in taking greater responsibility for what they learn, how they learn, and when they learn.

In terms of the teacher's role in helping their students to develop autonomy, Nemethová (2020) says that students should be permitted to work in their own way; teachers should facilitate this by offering them a range of activities and tasks from which they can choose, by encouraging them to ask questions, and ensuring that they feel confident about seeking out alternatives that best suit their approach while still meeting requirements.

This approach provides the perfect grounds for studying students' preferred learning styles. By giving students the opportunity to choose their favoured learning style, it encourages them to think about and reflect on how they prefer to learn; they are then offered a variety of ways to access their chosen approach and can then receive feedback on how effective and efficient it is for them. Teachers should also propose some suggestions for improvement or adjustments if the student's chosen method does not allow them to learn effectively the way they prefer, a technique known as style stretching (see Tuan, 2011).

Griffiths (2015) mentions several authors who have discussed style stretching and the importance of style flexibility. For example, Little and Singleton (1990) claim that learning styles can be adapted with experience and training, while Cohen and Dörnyei (2002) even recommend encouraging learners to stretch their learning styles and be introduced to approaches in learning that they would not normally use. Dörnyei (2005) also suggests that the more styles a student employs, the more effective they can become as a learner. Oxford (2011) states that even if a learner has strong style preferences, they can still be altered or modified. Wong and Nunan (2011) also relate style flexibility to learning effectivity, and Cohen (2012) even actively recommends training by stretching the comfort zone of learning styles.

The research in learning styles complies with the so-called postmethod pedagogy as defined by Kumaravadivelu (2008, p. 87) which she describes as a "three-dimensional system consisting of three pedagogic parameters: particularity, practicality and possibility." The Parameter of Particularity states that "any postmethod pedagogy must be sensitive to a particular group of teachers

teaching a particular group of learners pursuing a particular set of goals within a particular institutional context embedded in a particular sociocultural milieu" (Kumaravadivelu, 2001, p. 138). This approach correlates with the need to consider the individual differences between teachers themselves, with each possessing their own set of beliefs and teaching styles. Teachers' approaches should therefore be adapted according to the needs and preferences of their particular group of learners.

The Parameter of Practicality "relates broadly to the relationship between theory and practice, and narrowly to the teacher's skill in monitoring his or her teaching effectiveness" (Kumaravadivelu, 2008, p. 172), thereby suggesting that teachers should apply their theoretical knowledge (or parts thereof) in practice according to the needs and capacities of specific groups of learners. This approach requires teachers to reflect upon themselves and their approaches, while constantly evaluating their teaching performance.

The Parameter of Possibility is also related to the awareness that learning a foreign language also involves students acquiring a different learner identity through their exposure to language ideologies. This is a phenomenon which teachers cannot ignore, and they must be able to react to possible problems and obstacles which students may face throughout the learning process. Kumaravadivelu (2008, p. 175) says that "language education provides its participants with challenges and opportunities for a continual quest for subjectivity and self-identity." Moreover, subjectivity, individual differences and personality are deeply rooted and reflected in an individual's preferred ways of learning, all of which can help an individual to create a foreign language identity through their chosen method of picking up elements of a language, whether conscious or unconscious.

Research Objectives

The aim of the mixed-methods research into the English language learning styles of FEEC BUT students was to identify any similarities in the learning styles of the surveyed students. In the quantitative phase of the research, the Ehrman and Leaver Questionnaire (2003) was applied to identify commonly preferred dimensions of learning styles of English among technical students and to explore how flexible or rigid these preferences were or if any students exhibited strong preferences for particular approaches. In the subsequent qualitative phase of the study, students were invited to participate in interviews where they discussed the individual features of their English learning styles, including relevant examples, and assess the success of their chosen style. Another

question examined their willingness to change their learning styles if they had failed to make progress and their reasons for doing so. A semi-structured questionnaire was used for the interviews, with students only discussing the dimensions for which they had expressed a strong preference.

Research Hypotheses

H1. A high number of FEEC BUT students share some common preferences for learning styles.

H2. Students demonstrate flexibility in the case of at least two dimensions of learning styles.

Research Questions

Q1. Which dimensions of learning styles are most commonly preferred?

Q2. Are there any dimensions of learning styles in which students are particularly flexible or rigid? If so, what are they?

Q3. What are the reasons for the willingness or unwillingness to change their learning styles?

Participants

The research group consisted of a sample group of FEEC BUT students, approximately half of whom were enrolled in bachelor's and the other half in master's study programs. The method of convenience sampling was applied. The majority of participants were males who ranged from 20 to 24 years of age. First-year students were not included in the research due to the high rate of student dropout after the first year of their studies, with this factor making the subsequent interviews impossible.

Research Tools

Ehrman and Leaver Construct (2003)

The questionnaire is based on the psychological personality typology determined by the Myers-Briggs Type Indicator questionnaire (1956) which enabled us to gain a fuller understanding of the participants' preferred dimensions of learning styles. The Ehrman and Leaver Construct (2003) (hereinafter referred to as the E+L questionnaire) assesses learning styles on a continuum between synoptic and ectenic poles. The synoptic pole relates to the subcon-

scious and implicit processing of information and is likely to perceive phenomena as wholes, unlike those reflecting the ectenic one, which prefer conscious control over the learning process and show a tendency to perceive phenomena as composites.

The questionnaire consists of sixty statements, thirty of which evaluate each of the two poles. Each pole is subdivided into ten dimensions, each of which is queried by three statements in the questionnaire. These statements are presented in a contrasting manner, and respondents select the statement which best reflects their thinking using a 9-point Likert scale ranging from a mild preference to a strong need.

The ten bipolar cognitive dimensions are as follows: field dependent vs. field independent, field sensitive vs. field insensitive, random vs. sequential, global vs. particular, inductive vs. deductive, synthetic vs. analytic, analogue vs. digital, concrete vs. abstract, levelling vs. sharpening, and impulsive vs. reflective.

The model also reflects the following theory of brain hemisphere functions developed by Seikel (2018):

The right hemisphere has the following functions:

– parallel processing,
– synthesis,
– providing linguistic context,
– perceiving data as a whole,
– comprehending and interpreting emotions.

The left hemisphere is responsible for the following functions:

– language reception,
– structure of language, mainly syntax, morphology and phonology,
– serial information processing,
– judgement,
– processing details,
– analysis and categorisation,
– memory-related operations.

Ehrman and Leaver, who developed the Construct, state that very few people prefer only one pole exclusively, with most people switching fluently from one pole to another and, by extension, moving between implicit and explicit learning. The implicit learning techniques of the synoptic pole are mostly governed by the right hemisphere, while explicit learning styles associated with the ectenic pole are dominated by the left hemisphere.

Interview Questionnaire Based on the Ehrman and Leaver Construct (2003)

The questionnaire contained only those statements from the E+L questionnaire which referred to the dimensions for which students had shown a preference, more specifically the following questions:

1. What came to your mind when you read the questionnaire statements? Can you give any concrete examples of how you learn?
2. Would you find it difficult to learn in the styles indicated in the opposing statement in the questionnaire?
3. Did you experience learning success with your chosen style? Can you recall any difficulties you experienced using this style?
4. Would you be willing to change your style of learning if it offered the possibility of making progress? What would be the biggest obstacle for you in doing so?

Analysis

Quantitative Phase

The Czech version of the E+L questionnaire was successfully tested on a group of 150 students in 2020, but the responses obtained in this preliminary study are not included in the current research as it was only intended as a pilot study.

The quantitative phase was carried out in 2022, with a total of 400 participants filling out an online version of the Ehrman and Leaver questionnaire as part of their English classes. The questionnaire was adapted from the E+L questionnaire and featured 30 statements to which participants responded on a 10-grade Likert scale, with answers 1, 2, 3 and 7, 8, 9 showing their strong preference for either of the two poles and answer 5 meaning "I can do both well." For the purposes of the research, an additional answer 10 was added which means "I don't know, I cannot identify with either of the two statements" with the aim of identifying flexible students who are comfortable with both of the suggested approaches. Only 250 of the 400 questionnaires were selected for analysis, with any incomplete questionnaires or those featuring responses with answer 10 being excluded. The data was analysed as follows: the average score in each of the dimensions was calculated by summing the responses in the three questions representing each dimension. If the average score was lower than or equal to 4, the style was ranked on the left pole, that is, reflect-

ing synoptic dimensions. If the average score was greater than or equal to 6, the style was ranked on the right pole, that is, reflecting ectenic dimensions. Average scores ranging from 4.1 to 5.9 showed flexibility in the respective style. The style in a particular dimension was considered flexible if the percentage of flexibility among all students in the given dimension was greater than 30%. The full results are shown in Table 1. Mean, standard deviation and upper and lower quartiles were also calculated, and these are shown in Table 2.

Table 1

Percentages of Responses in Individual Dimensions (N = 409)

Dimension	Average score		
	avg. ≤ 4 %	avg. ≥6 %	avg. 4.1–5.9 %
D1			
Field sensitive	65		
Field insensitive		15	
Flexible			20
D2			
Field dependent	27		
Field independent		26	
Flexible			47
D3			
Leveling	36		
Sharpening		27	
Flexible			37
D4			
Global	66		
Particular		8	
Flexible			26
D5			
Impulsive	30		
Reflective		40	
Flexible			30

Table 1 continued

Dimension	Average score		
	avg. ≤ 4 %	avg. ≥6 %	avg. 4.1–5.9 %
D6			
Synthetic	42		
Analytic		28	
Flexible			30
D7			
Analogue	25		
Digital		37	
Flexible			38
D8			
Concrete	78		
Abstract		5	
Flexible			17
D9			
Random	25		
Sequential		47	
Flexible			28
D10			
Inductive	27		
Deductive		33	
Flexible			40

Table 2

Means and Standard Deviations of the Likert-scale Responses

Dimension	Basic characteristics of the dataset				
	Mean	SD	UQ	Median	LQ
D1	3.56	1.97	4.67	3	2
D2	4.91	1.30	6	5	4
D3	4.87	1.56	6	4.67	4
D4	3.58	1.51	4.67	3.50	2.33

Table 2 continued

Dimension	Basic characteristics of the dataset				
	Mean	SD	UQ	Median	LQ
D5	5.24	1.92	6.67	5	3.67
D6	4.70	1.76	6	4.67	3.33
D7	5.32	1.64	6.33	5.33	4
D8	3.23	1.44	4	3	2.33
D9	5.56	1.88	7	5.67	4
D10	5.14	1.66	6.33	5	4

Quantitative Phase Results

The analysis revealed that there were five preferred learning styles, three of which lay on the synoptic pole and two on the ectenic pole. The synoptic learning styles, namely field sensitive, global and concrete approaches, were found to be more popular than the two ectenic learning styles, the reflective and sequential approaches. The analysis confirmed H1, as the results show that a high percentage of students favoured each of the preferred dimensions. The field-sensitive learning style was favoured by 65% of the students, the global learning style by 66%, the concrete learning style by 78%, the reflective learning style by 40% and the sequential learning style by 47%. The results also showed flexibility in four dimensions, namely field dependence/independence, levelling/sharpening, analogue/digital, and inductive/deductive, a finding which confirms H2.

Qualitative Phase

The qualitative phase consisted of interviews conducted with ten students who had participated in the questionnaire phase. A total of 36 students of the 250 respondents were selected for interviews based on the combination of their learning styles, but only ten of them were willing to participate. The interviews were conducted online using MS Teams software in order to allow students to feel comfortable while being interviewed. The interviews were intended to be diagnostic, with the interviewers applying the techniques of paraphrasing, interpretation and rephrasing. The interviewed students showed a very strong preference for at least two of the commonly shared learning styles dimensions, and as a consequence, the number of students who provided answers to individual dimensions differed. In summary, the following dimensions were discussed by the interviewed students: the field sensitivity dimension (by ten students), the

global learning style (six students), the concrete learning style (eight students), the reflective learning style (one student), and the sequential learning style (two students) (see Table 3).

Table 3

Table of Students Selected for Interview Based on Their Preferred Learning Styles

Learning style	Students' preferences										
	Total	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Field sensitive	10	x	x	x	x	x	x	x	x	x	x
Global	6		x	x	x	x				x	x
Concrete	8	x	x	x	x	x	x	x	x		
Sequential	2						x			x	
Reflective	1										x

Qualitative Phase Results

In this section, we will examine the styles which were discussed by the interviewees in more detail:

- **field-sensitive (synoptic)**

A field-sensitive person can be described as someone who prefers to work with new material in context, such as in stories and articles or, at the very least, in sentences. They often pick up new words or ideas in a haphazard manner, without planning in advance. Students mentioned listening as the main input channel in this style, with some stating that they managed to pick up new words, phrases, and grammatical structures without actually realizing it ("I can recognize a mistake because it sounds strange," "I heard it said this way").

Most students claimed that they learned successfully using this approach; they said that they remembered the acquired structures later on, but that this was conditioned by the frequency at which they were exposed to it or by the context or situation in which they encountered the structures. However, students were not capable of learning some language skills in this style, in particular those of grammar, accuracy of translation and meaning and irregular verb forms. When asked about their willingness to change their way of learning, few students said that they would be willing to change, but most of them also reported that they had already tried and it had not worked for various reasons (see Table 4).

Their answers thus perfectly matched the description of the dimension in the questionnaire manual; the results demonstrate that most are rigid in their preferred way of learning, offering little or no space for change. In terms of the pedagogical implications arising from the students' answers, we can see that other ways of teaching are necessary in order to improve their accuracy and precision in meaning.

Table 4

Characteristics of Learning in Field Sensitivity Dimension

Dimension Field Sensitive (*N* = 10)				
Learning by this style	Drawbacks	Learning in an opposite style	Flexibility	Pedagogical implications
Context: mostly audio, less frequently written. Acquired items: words, phrases, gram. structures. Success in learning such structures conditioned by the frequency of exposure.	Inability to learn grammar correctly. Low accuracy in translation and lexical production.	Tried drill, memorising vocabulary and gram. rules in elementary and secondary education, without success. Hate memorising tend to forget memorized structures soon. Never really understood grammar from gram. rules.	Rigid	Alternative ways of teaching accuracy in meaning and grammar.

- **global (synoptic)**

People who learn globally tend to adopt a "big picture" perspective; seeing the "forest rather than the trees," they typically start with the main points and only come to the details at a later point. Students who favoured this approach described understanding the meaning and the plot of a text/video first; only then could they focus on details, such as form and usage.

Learners using this approach also stated that they had difficulty learning details this way and that they struggled to discern differences in the meanings of words. When asked about their willingness to learn in an opposite way, most students replied that it would be possible, but they would find it unnatural and would have to skip a lot of information in order to see how things are connected into a meaningful unit (see Table 5 for more details).

The pedagogical implications of these views are clear. There is no need to force such learners to adopt an opposite way of learning, since context as a determiner of meaning is their primary means of understanding and learning, and a subsequent focus on the details is a frequent and normal practice in English lessons.

Table 5

Characteristics of Learning in Global Dimension

Dimension Global (*N* = 6)				
Learning by this style	Drawbacks	Learning in an opposite style	Flexibility	Pedagogical implications
Learning tenses: first they need to understand the context, only then can they identify and concentrate on grammatical forms. Text, video: first story, only after repeated input do they notice details, grammar, vocabulary. New word: first meaning, then form. Success in learning.	Difficulty in finding and understanding details, differences in meaning. Difficulty to translate a sentence without context. Difficulty to remember shades of lexical meaning and exceptions in grammatical rules.	Probably possible, but unnatural. Few students tried.	Rigid	Focus on context as the determiner of meaning and draw attention to details and their form.

- **concrete (synoptic)**

People favouring this style need to interact with the world directly in order to acquire new knowledge and learn through practical application, especially if they can touch, see or hear the new information. The students offered various examples of learning through the manipulation of objects and by using their senses for both concentrating and relieving stress (see Table 6 for more details).

However, students stated that they were unable to learn theory using this style. They have difficulty memorising things, so they write cheat notes and highlight important information, with this approach allowing them to subsequently recall the location of the important information visually.

Learning by any other method would likely be impossible for such students as they would miss the application of the theory and, as was noted above, they have difficulty learning information by heart. Some students also mentioned that they are unable to focus on form alone and that they would miss seeing the continuity with the previous knowledge they have gained.

It can therefore be concluded that students preferring this style tend to be quite rigid in their preferences and that it would not be possible to shift their abilities to the other pole.

Table 6

Characteristics of Learning in Concrete Dimension

Dimension Concrete (*N* = 8)				
Learning by this style	Drawbacks	Learning in an opposite style	Flexibility	Pedagogical implications
Learning through manipulating things, trial and error, programming, experimenting, testing equipment before reading a manual. Employing senses: Listening: music (to create context, shut the outer world). Haptic and kinaesthetic experience: walking, changing postures, squeezing a rubber, fiddling with a pen (to concentrate better, to cope with stress). Inductive learning (first try out, then deduce theory). Success in learning.	Cannot learn theory, difficulty memorising things.	Impossible, they would miss the application. Strategies to learn theory: writing cheaters, highlighting important information.	Rigid	No need to change it.

- **sequential (ectenic)**

Students favouring this approach learn most effectively when they are provided with a sequence of steps that they can follow such as textbooks and lesson plans. Many students at FEEC BUT appreciate learning approaches that offer systematized and hierarchized information and the logical structure of a textbook. If they are forced to learn in an opposite manner, that is, by developing their own system, they find it difficult to differentiate between important and unimportant information. Nevertheless, if they were certain that this approach could offer better results, these students would adopt the opposite style even if took them more time to learn (see Table 7).

Thus, it can be concluded that students favouring this approach are flexible and that there are some grounds for persuading them to try another learning style. Students who have the opportunity to organise things in their own way employ creativity which can help them to remember new information more effectively.

Table 7

Characteristics of Learning in Sequential Dimension

Dimension Sequential (*N* = 2)				
Learning by this style	Drawbacks	Learning in an opposite style	Flexibility	Pedagogical implications
Appreciate structured chapters in textbooks. Hierarchy, order and system in new information. Topics linked logically one to another.	Difficulty in distinguishing importance of information, in prioritizing information on their own.	Difficult, but feasible.	Flexible	Enhancing students´ creativity. Encouraging them to reorganize information in their own way.

- **reflective (ectenic)**

This style can be characterised by the need to think things through before applying the newly acquired skills or information. Only one student mentioned this learning style in the interviews (see Table 8), stating that he feels nervous or uncomfortable when asked to answer a question without preparation and would be far happier if he had some time to think before giving an answer. When asked to consider learning in an opposite way, such as by studying in advance in the comfort of his home, he said that this would be feasible for him; he also predicted that it would make him feel more confident and secure and more willing to react and respond more quickly.

This suggests that students would benefit from dedicating time to home preparation rather than just following their teachers' instructions. The approach would also help students feel more confident in learning and to react faster and more spontaneously in class.

Table 8

Characteristics of Learning in Reflective Dimension

Dimension Reflective (*N* = 1)				
Learning by this style	Drawbacks	Learning in an opposite style	Flexibility	Pedagogical implications
Need time to think about the answer in order to form a reply confidently.	Slow reactions, feelings of uncertainty and uneasiness if expected to react fast and spontaneously.	Faster reactions would require a familiarity with the topic and home preparation.	Flexible	Enhancing home preparation and allowing enough time for preparation in class.

Conclusion

The findings of the research have offered some valuable information on the ways in which students learn English. The results of the quantitative research show that the vast majority of students (65%, 66% and 78% in field-sensitive, global and concrete learning styles, respectively) prefer to learn implicitly and subconsciously, without paying too much attention to form and accuracy. Their approach to learning languages can be described as somewhat unsystematic, with students picking up elements of language in a random and osmotic manner based on the immediate content they came across. Students also showed a preference for learning through practical application prior to studying the theory, even if this approach requires a considerable amount of trial and error. Learning through the senses is an essential part of students' learning experience, with many expressing enthusiasm for hands-on experience. Many also stated their need to see the "big picture" before focusing on details. The results also suggest that students are not very spontaneous in their reactions (40% of the students favoured a reflective learning style), as they prefer to have some time to think about their answers in advance and to consider systematically prepared materials.

The more detailed qualitative data about students' learning styles was based on a relatively small sample of ten students who participated in the interviews, and the low participation of students in this element of the study is perhaps the biggest limitation of the research. Nevertheless, the interviews provided interesting insights into individuals' ways of learning. Although the small sample size makes it difficult to draw generalised conclusions on students' approaches, several ideas emerged in the discussions on individual learning styles. The strong preference for field sensitivity noted by students can result in low accuracy and precision in grammar and a lack of understanding of the ambiguities of meaning in vocabulary. Similarly, a strong preference for learning globally can imply a limited ability to focus on details before fully understanding the context and scanning for a particular piece of information. This approach often requires a longer time because students must first grasp the whole meaning before moving on to distinguish the components of a statement. A high preference for learning concretely suggests that students struggle with memorising information, and this could also imply they may have problems with concentration, with six out of eight interviewees stating that they need to use their physical senses to stave off their discomfort before memorising theory. A preference for sequential learning styles may also indicate a low willingness to be creative and develop their own systems, but this is something that can be learnt in order to make progress. Lastly, the preference for reflective styles noted by many students may imply a low confidence in their own abilities, but this could

be strengthened or even avoided with careful home preparation. In conclusion, the qualitative phase results brought a number of interesting findings which should be considered and reflected upon in the formulation of new pedagogical approaches tailored to this specific group of learners.

The research also explored the similarities which students share in their learning styles and preferences and the way in which these styles influence their success or failure in learning different language skills and abilities. Once again, while the quantitative section covered a relatively wide range of student preferences for learning, the small sample involved in the qualitative part makes it hard to draw any substantiated conclusions. Nonetheless, the interviews still suggested various implications of the reasons why students made progress or failed to do so and also raised questions about the ways in which students can assess their language skills to help them learn more effectively. Teachers can play a key role here by helping students analyse what approach may be beneficial to them and identify potential problems and obstacles they might face if they use the same learning styles in all tasks. It would be reasonable to discuss the benefits and the drawbacks of individual learning styles with students and to show them the importance of using a variety of learning styles to acquire a wider range of skills. This is where the so-called stretching of styles comes into play; a greater willingness to step out of one's comfort zone and adapt to new demands might turn out to be one of the key personality features determining the success or failure of achieving one's goals, but this is a conjecture which would require further research.

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