

Investigating the relationship between learning styles, learning strategies and students' performance in a blended learning course: A research proposal

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Abstract

Individual differences (IDs), described as characteristics in respect of which people differ from each other, are a vital aspect of the process of second language acquisition (SLA). A number of researchers have invested much effort into examining their nature in order to formulate valid conclusions which could be useful for classroom practice. The paper presents a research proposal for investigating the relationship between the learning styles and learning strategies applied by students of electronics and telecommunications attending a blended learning (BL) course in English as a foreign language, as well as tapping the link between the two ID variables and students' performance.

1. Introduction

Researchers in the field of second language acquisition (SLA) have manifested considerable interest in the individual differences between people learning their second, third or even fourth foreign language. A number of psychologists and applied linguists have made many attempts to define, describe and classify individual differences in order to find factors that account for success in learning a second or foreign language (L2). The current paper describes a research proposal which provided a basis for a study conducted in the Centre of Languages

and Communication of Poznań University of Technology in the academic year 2012/2013. In the first part, a theoretical background is provided which focuses on the definitions, classifications and research into learning styles, learning strategies, and computer-assisted language learning (CALL). The second part presents the actual research proposal, offering a description of the research questions, participants, instruments as well as the procedures used for data collection and analysis.

2. Literature overview

It is interesting to note that while providing definitions and descriptions of individual differences is not very problematic, one generally accepted classification is hard to come by. As Cohen (2010: 161) explains, “when students embark on the study of an L2, they are not merely ‘empty vessels’ that will need to be filled by the wise words of the teacher; instead, they carry a considerable ‘personal baggage’ to the language course that will have a significant bearing on how learning proceeds”. Indeed, a handful of factors in the learner’s ‘baggage’ can potentially affect success in foreign language learning. Among them, there are variables that are relatively easily identifiable, such as age or gender, and those that are much more difficult to grasp, including intelligence, aptitude, motivation, learning styles, learning strategies or personality factors.

2.1. Research into learning styles and learning strategies

Interestingly, in many classifications of IDs, proposed by various experts, learning styles and learning strategies come together, which is illustrated in Table 1. Brown (2000), for example, makes a distinction between styles and strategies, personality factors (i.e. self-esteem, inhibition, risk-taking, anxiety, empathy, extroversion/introversion and motivation), sociocultural factors, age, aptitude and intelligence, and discusses them in separate chapters. It is interesting to observe that he views motivation as a personality factor, which might be regarded as somewhat surprising. Ehrman, Leaver and Oxford (2003) focus their attention on learning styles, learning strategies and affective variables (i.e. motivation, self-efficacy, tolerance of ambiguity and anxiety). They also mention other areas of individual differences, such as aptitude, gender, culture, age and other demographic variables. Dörnyei and Skehan (2003) organize their paper on IDs in SLA into the following four main sections: foreign language aptitude, cognitive and learning styles, learner strategies and motivation. However, decide to exclude some ID variables; for example they do not describe personality and justify this omission partly by the fact that this area has not been sufficiently

explored yet. Dörnyei (2006) provides an overview of five individual factors which comprise personality, aptitude, motivation, learning styles and learning strategies, all of which he sees as the most important ID variables.

Two recent taxonomies of individual differences have been proposed by Pawlak (2009) and Cohen (2010). Pawlak (2009) confines his discussion to the following IDs: age, intelligence, aptitude, cognitive and learning styles, learning strategies, motivation, anxiety, beliefs and willingness to communicate, which are grouped into four categories. Firstly, he describes age, intelligence and aptitude, which he views as factors that are cognitive in nature and cannot be controlled by the teacher or the learner. Secondly, he enumerates cognitive styles, learning styles and learning strategies which are, similarly to age, intelligence and aptitude, cognitive in nature but can be manipulated externally to some extent. Thirdly, the scholar focuses on motivation, which is clearly subject to change and, finally, he frames his discussion around anxiety, beliefs and willingness to communicate. Cohen (2010) chooses to focus on characteristics outside the teacher's control and characteristics that can be shaped during the process of second or foreign language learning. Among the former he includes age, gender and language aptitude. The latter comprise learning styles, learning strategies and motivation, which, in his view, are interrelated in a variety of ways.

author	taxonomy
Brown (2000)	styles and strategies, personality factors, sociocultural factors, age, aptitude and intelligence
Ehrman, Leaver and Oxford (2003)	learning styles, learning strategies and affective variables
Dörnyei and Skehan (2003)	aptitude, cognitive and learning styles, learner strategies and motivation
Dörnyei (2006)	personality, aptitude, motivation, learning styles and learning strategies
Pawlak (2009)	age, intelligence, aptitude, cognitive and learning styles, learning strategies, motivation, anxiety, beliefs and willingness to communicate
Cohen (2010)	characteristics outside the teacher's control and characteristics that can be shaped during the process of second language learning

Table 1: Individual learner differences taxonomies.

Having discussed different IDs taxonomies, it is finally time to explain what learning styles and learning strategies actually are. Anderson (2005: 758), for example, defines learning styles as: "(...) the general approach one takes to learning; the ways that we prefer to organize and retain information". Brown (2000: 113), in turn, argues: "Style is a term that refers to consistent and rather enduring tendencies or preferences within an individual". It is obvious that due to the fact that people differ, they can approach the same learning task in different

ways and the approaches are characterized by systematic patterns called learning styles. What is promising about learning styles is the fact that, in comparison to abilities, they do not reflect innate endowment and each person can achieve success in every style position. Ehrman, Leaver and Oxford (2003) provide a list of terms referring to learning styles, existing in the literature, which are as follows: *learning style, cognitive style, personality type, sensory preference or modality*. It should be emphasized that there are a number of models of learning styles in the literature. One of the most widely known theories of learning styles was proposed by Kolb (Kolb 1984; Kolb et al. 2001). According to this theory, the learning style construct is a combination of the following two dimensions: *concrete vs. abstract thinking* and *active vs. reflective information processing*. On the basis of these two style continuums, four learning styles emerge: *divergers* (concrete and reflective), *convergers* (abstract and active), *assimilators* (abstract and reflective) and *accommodators* (concrete and active).

Probably, a more widely known learning style dimension "(...) concerns the perceptual modes or learning channels through which students take in information (...)" (Dörnyei 2005: 139). These are known as *sensory preferences* and are categorized into *visual, auditory, kinesthetic* and *tactile*. As different theories of learning styles exist, there is also a plethora of instruments designed to measure them. The best-known measurement tools include, for example, the *Perceptual Learning Style Preference Questionnaire* (Reid 1995), the *Style Analysis Survey* (Oxford 1993), the *Learning Style Inventory* (Kolb 1999), or the *Learning Style Survey* (Cohen, Oxford and Chi 2002).

As far as learning strategies are concerned, research in this area was heralded by the 'good language learner' studies focusing on the characteristics that make some learners more successful than others when it comes to L2 learning (Rubin 1975; Stern 1975; Naiman et al. 1978). Drożdżał-Szelest (1997) provides a comprehensive overview of learning strategies definitions, one of which was proposed by Rubin (1987: 19), who states: "(...) learner strategies include any set of operations, steps, plans, routines used by the learner to facilitate the obtaining, storage, retrieval and use of information, (...) that is what learners do to learn and do to regulate their learning". Another definition was offered by Chamot (2004: 14), who claims: "Learning strategies are the thoughts and actions that individuals use to accomplish a learning goal". When it comes to taxonomies of learning strategies, two of the most widely known include those by Oxford (1990) and O'Malley and Chamot (1990). As regards Oxford's strategy system, it consists of two main parts: *direct strategies* and *indirect strategies*, which are further divided into six classes of strategies, that is *cognitive, memory, compensation* (direct strategies), and *metacognitive, affective* and *social* (indirect strategies). O'Malley and Chamot offered a similar taxonomy and distinguished

three main classes of strategies: *cognitive*, *metacognitive* and *social/affective*. Similarly to learning styles, learning strategies can be measured using self-report questionnaires. Probably the most frequently used ones are the *Strategy Inventory for Language Learning* (Oxford 1989) or the *Language Strategy Use Inventory and Index* (Cohen and Chi 2002).

2.2. Computer-assisted language learning

A significant aspect of the current article is concerned with the issue of *Computer-assisted language learning*, which is a vast area that has evolved dramatically in the last 50+ years and is now a crucial component of second and foreign language learning pedagogy. Originally viewed as a supplement to classroom instruction, at present CALL is used to promote learner autonomy and encourages involvement in L2 learning inside and outside the classroom (Fotos and Browne 2011a).

Various attempts have been made to offer a comprehensive definition of CALL. Garrett (2009: 719), for example, defines CALL as "(...) the full integration of technology into language learning". Another definition of CALL that is commonly cited by different scholars (Gruba 2004; Chapelle 2010a; Fotos and Browne 2011b) has been proposed by Levy (1997: 1), who claims that computer-assisted language learning is "(...) the search for and study of applications of the computer in language teaching and learning".

Although the term *Computer-assisted language learning* appears to be the most widely used by different researchers, Stockwell (2012: 10) enumerates various labels for CALL, stating that: "A number of acronyms have been used in the past several years, including CALL/CELL (computer-assisted/enhanced language learning), CASLA (computer-assisted second language acquisition), TALL/TELL (technology-assisted/enhanced language learning), NBLT (network-based language teaching), and, more recently, MALL (mobile-assisted language learning), to name a few". State-of-the-art research on CALL has addressed such issues as the relationship between SLA and CALL (Chapelle 2009), technologies and language learning (Levy 2009; Garrett 2009) or the interrelations between traditional coursebook teaching and CALL (Krajka 2006).

It should be emphasized that the environments in which computer technology is used nowadays have changed significantly over the years (cf. Olejarczuk 2014). Stockwell and Tanaka-Ellis (2012) divide the CALL environments into the following four categories: *face-to-face (F2F) environments*, *blended environments*, *distance environments*, and *virtual environments*. Due to the fact that the scope of this section is limited, special attention will be given to *blended*

learning, which is the focus of the current paper. The term has been defined by Sharma and Barrett (2007: 7) in the following way:

Blended learning refers to a language course which combines a face-to-face (F2F) classroom component with an appropriate use of technology. The term *technology* covers a wide range of recent technologies, such as the Internet, CD-ROMs and interactive whiteboards. It also includes the use of computers as a means of communication, such as chat and email, and a number of environments which enable teachers to enrich their courses, such as VLEs (virtual learning environments), blogs and wikis.

A number of instruments have been designed to measure students' attitudes towards CALL, among them: the *Internet Use and Attitude towards the Internet Survey* (Luan et al. 2005) or the *Learner Profile* containing a CALL component (Olejarczuk 2013), the latter of which will be described in section 5 below as it was used in the study conducted by the author.

2.3. The relationship between learning styles, learning strategies, students' performance and CALL

It is interesting to note that a number of studies have sought to examine the role of learning styles (Seliger 1977; Naiman et al. 1978; Chapelle and Roberts 1986) and learning strategies (Rubin 1975; Stern 1975; Cohen 1990; O'Malley and Chamot 1990; Oxford 1990; Anderson 1991; Wenden 1991) in second language learning. As Rossi-Lee (1995) suggests, there is a relationship between learning styles and learning strategies, an assumption that is supported by Anderson (2005: 758) who points out that: "strategies are typically linked to a learning style" and by Ehrman, Leaver and Oxford (2003: 315) who state that: "Learning styles and learning strategies are often seen as interrelated. Styles are made manifest by learning strategies (overt learning behaviors/actions)".

When it comes to the link between CALL and L2 learning outcomes, programme directors, syllabus creators as well as teachers wish to assess the effectiveness of instruction provided by means of the computer and the success of technological innovations brought into the classroom (Chapelle 2010b). Recently, the field of CALL has witnessed a veritable explosion in the number of studies examining the effectiveness of blended learning versus traditional learning. Research in this area usually involves experimental and control groups and findings of such studies can be divided into two categories, according to the outcomes. Firstly, there are researchers who found that there was no difference between blended learning and traditional learning instruction when it comes to foreign language achievement (e.g. Blake et al. 2008). Secondly, some studies on

the effect of CALL have proved that blended learning was superior in comparison with traditional instruction (e.g. Sullivan and Pratt 1996; Jafarian et al. 2012).

Although there has been much research focusing on the relationship between learning styles, learning strategies and proficiency in L2 learning, to the best knowledge of the present author, no research has been conducted with a view to determining the relationship between learning styles, learning strategies and FL proficiency in a blended learning environment. Therefore, this topic appears to be both challenging and interesting.

3. Research questions

In light of the fact that the relationship between learning styles, learning strategies and FL proficiency in a blended learning environment is still under-researched, the current study aimed to contribute to this line of enquiry. More specifically, the present research sought to address the following research questions:

- What is the relationship between learning styles, learning strategies and CALL?
- Is there a relationship between the selected ID variables (i.e. learning styles and learning strategies) and proficiency in second language learning?
- Is there a relationship between learners' beliefs about CALL and L2 proficiency?

4. Participants

Three groups of students participating in a blended learning course of English as a foreign language at Poznań University of Technology were involved in the study. The learners were taught English for Specific Purposes (ESP) in a course that was divided into two parts:

- (1) 70% of classes was conducted in the classroom with the teacher;
- (2) 30% of the classes was conducted online, outside the classroom, under the teacher's supervision.

The participants were 60 Polish learners, 49 males and 11 females, (N=60; average age=20.4), who studied electronics and telecommunications in the first year of a full-time program. Their command of English could be characterized as B2 according to the Common European Framework of Reference for Languages (CEFR).

5. Instruments

The following six instruments were used in the study: the *Learner Profile* containing a CALL component (Olejarczuk 2013), the *Strategy Inventory for Language*

Learning (Oxford 1989), the *Learning Style Survey* (Cohen, Oxford and Chi 2002), the *BULATS* tests (2007, 2010), speaking tasks and Guided Writings.

When it comes to the *Learner Profile* (LP), it is a questionnaire that was specifically developed by the author of the study for the purpose of the current research project. It is an instrument used to gather information about the students participating in the study. The questionnaire was designed in such a way that its administration should not take longer than 30 minutes. Table 2 presents the main four parts of the *Learner Profile*. It is worth mentioning that part 2B – *CALL application* was the most important one in the questionnaire because it was directly connected with the students' beliefs about CALL. It consisted of 27, 5-point Likert-scale items, where 1 indicated complete disagreement and 5 complete agreement. There was also one open-ended question at the end of the *CALL application* part, namely: 'Do you use the computer to learn English in any other way? If yes, please specify'. The aim of this question was to obtain additional information from students about using the computer in learning English.

<i>The Learner Profile</i>	
1. General information	1A General information about the students 1B General information about learning English
2. Computer Assisted language Learning (CALL)	2A General information according to using technology 2B CALL application

Table 2: The *Learner Profile* parts.

The second instrument that was used for the purpose of the research project, the *Strategy Inventory for Language Learning* (SILL) was developed by Oxford (1989). The SILL is one of the most widely used self-report questionnaires in foreign language learning studies to assess the use of language learning strategies. It should be noted that the SILL, version 7.0 (ESL/EFL), consists of 50, 5-point Likert-scale items, where 1 indicates 'never or almost never true of me' and 5 indicates 'always or almost always true of me'. While completing the questionnaire, the participants are asked to provide answers in terms of how well the statements describe them. The time that is allotted to completing the questionnaire is no longer than 30 minutes. Table 3 presents sample items of the *Strategy Inventory for Language Learning*, which is based on Oxford's (1990) taxonomy of language learning strategies.

parts	strategies	sample items
A	memory strategies	I remember new English words or phrases by remembering their location on the page, on the board, or on a street sign.
B	cognitive strategies	I find the meaning of an English word by dividing it into parts that I understand.
C	compensation strategies	If I can't think of an English word, I use a word or phrase that means the same thing.
D	metacognitive strategies	I plan my schedule so I will have enough time to study English.
E	affective strategies	I encourage myself to speak English even when I am afraid of making a mistake.
F	social strategies	If I do not understand something in English, I ask the other person to slow down or say it again.

Table 3: Sample items for Oxford's (1989) *Strategy Inventory for Language Learning*.

Another instrument used in the study was the *Learning Style Survey* (LSS), constructed by Cohen, Oxford and Chi (2002). The LSS is a self-report questionnaire consisting of 110, 5-point Likert-scale items, where 0 indicates 'never' and 4 indicates 'always'. This measurement tool is an instrument primarily used for the purpose of raising students' awareness of their own learning style preferences. The time that is allotted to completing the questionnaire is no longer than 30 minutes. Table 4 presents parts and sample items of the *Learning Style Survey*.

parts	sample items
How I use my physical senses	I remember something better if I write it down.
How I expose myself to learning situations	I learn better when I work or study with others than myself.
How I handle possibilities	I have a creative imagination.
How I deal with ambiguity and with deadlines	I like to plan language study sessions carefully and do lessons on time or early.
How I receive information	I prefer short and simple answers rather than long explanations.
How I further process information	I can summarize information easily.
How I commit material to memory	I try to pay attention to all the features of new material as I learn.
How I deal with language rules	I like to go from general patterns to the specific to the specific examples in learning.
How I deal with multiple inputs	I can separate out the relevant and important information in a given context even when distracting information is present.
How I deal with response time	I react quickly in language situations.
How literally I take reality	I find that building metaphors in my mind helps me deal with language (e.g. viewing the language like a machine with component parts that can be disassembled).

Table 4: Sample items from Cohen, Oxford and Chi's (2002) *Learning Style Survey*.

It should be noted that, similarly to the *Learner Profile* and the *Strategy Inventory for Language Learning*, this questionnaire was translated into Polish by the current researcher. This decision was dictated by the fact that there was a danger that the students could have misunderstood the questions in a foreign language. All the newly developed instruments, that is the *LP*, the *SILL* and the *LSS*, were piloted in January 2013 in a group of 25 students of electronics and telecommunications. The internal consistency reliability of the three measurement tools was established for all the participants by calculating Cronbach's alpha, which amounted to 0.78 (*CALL*, 27 items), 0.89 (*SILL*, 50 items) and 0.90 (*LSS*, 110 items). The calculations were done using SPSS software and the quoted values can be regarded as highly satisfactory.

The data collected by means of the above-mentioned instruments formed independent variables. The dependent variables were formed using pre-tests and post-tests designed to assess the participants' four language skills: listening, reading, speaking and writing. The first instrument was a proficiency test – the *BULATS* (BT), which is composed of two major parts: *Listening* (50 items) and *Reading and language knowledge* (60 items), and lasts 110 minutes (50 minutes for the *Listening* part and 60 minutes for the *Reading and language knowledge* part). The listening comprehension test is divided into four parts and the types of questions included in this component are: choosing the correct answer from a few options, completing a form with appropriate information or matching. The *Reading and language knowledge* parts are divided into sections, which include such tasks as:

- (1) choosing the correct answer from a few options, e.g. based on graphs and tables or a text;
- (2) reading a longer piece of text and marking the correct answers;
- (3) completing a short text with one word in each blank space (an open cloze exercise);
- (4) finding and correcting mistakes in a text.

Similarly to the proficiency test, speaking and writing tasks were conducted two times. Each *Speaking task* (ST) involved answering several questions related to business topics. The students had a time limit amounting to five minutes for performing this task and their utterances were recorded in a language laboratory under the supervision of a teacher of English. As far as the writing tasks are concerned, the learners were asked to complete a *Guided writing* (GW) task in 100-150 words in a computer laboratory and send it to the teacher. The guided writing topics were also related to business. In order to achieve objectivity, both speaking and writing tasks were assessed by two independent teachers of English. The first one was the current researcher and the second was a teacher from outside Poznań University of Technology.

6. Procedures of data collection and analysis

The data were collected during the period of four months from February to June 2013 at three points in time. As can be seen from Table 5, which presents the data collection procedure, in February the students took the following pre-tests: the *BULATS test 1*, *Guided writing 1* and *Speaking task 1*. In March the learners completed the *Learner Profile* containing a CALL component, the *Strategy Inventory for Language Learning* and the *Learning Style Survey*. Finally, at the end of the semester, they took post-tests: the *BULATS test 2*, *Guided writing 2* and *Speaking task 2*. The numerical data were analyzed using descriptive and correlational statistics. All statistical analyses carried out in the study were performed using a data analysis software system SPSS (*Statistical Package for the Social Sciences*), produced by SPSS, Inc. in Chicago, USA. In the current study a trial version 20 was used.

week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Class 1	BT1			GW	O2	O3	O4	O5	O6	O7	O8	O9	GW			BT2
				ST									O10			
Class 2			LP	LSS	SILL											

O=online class; GW=guided writing; ST=speaking task; BT=BULATS test

Table 5: Data collection procedure.

7. Conclusion

As Oxford (2001: 359) points out, “Language learning styles and strategies are among the main factors that help determine how – and how well – our students learn a second or foreign language”. Having the above in mind, it seems interesting to conduct research, the main aim of which is to explore which learning styles and learning strategies are employed by students. It is also interesting to cite Krajka (2012: 19), who states that: “The computer is one of the many technological tools that have been used in the process of language learning over the past few decades”. Being aware of the fact that using technology in education is becoming more and more widespread nowadays, it is reasonable to research students’ beliefs about computer-assisted language learning and to check whether there exists a relationship between CALL, learning styles, learning strategies and L2 learning. The study outlined in the present paper relied on a number of instruments with a view to obtaining as much insight into this issue as possible.

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