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A Comparative Analysis of Two Instruments Assessing Learning Style Preference

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Abstract

One of the most enduring concerns among academic educators in the University of Hradec Kralove is the enhancement of students' academic performance and consequently the improvement of the effective teaching and learning methods. The purpose of the presented research was to examine the outcomes of two instruments evaluating learning style preferences, namely ILS, Felder-Soloman's Index of Learning Styles, and LCI, Johnston-Danton's Learning Combination Inventory, in a focus group of students from four difference study fields: Information Management, Applied Informatics, Tourism Management, and Sport Management. The main aim was to analyse our students' learning style diversity and study the outcomes and ways of learning styles assessment of two different learning style instruments. Based on a comparative analysis of the data obtained from the ILS and LCI, intersections and common features were monitored in terms of the individual learning style preferences and frequencies. The acquired results showed marginal differences between the outcomes of the two learning style assessment instruments. In comparison to Felder Soloman Index, where most of focus group students of Tourism Management proved to be sensing and visual, while Applied Informatics students were identified as predominantly reflective and intuitive, LCI data indicated Tourism Management students as Precise (targeted at accuracy, detail & information) while Applied Informatics students proved to be Technical Processing (problem solving, preferring relevance & autonomy). However, the results indicated also consistency and common features of both learning style assessing instruments data.

Keywords: ILS; LCI; learning style preferences; assessing instrument; effective teaching methods;

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1. Introduction

Based on our latest research we can claim that students at our university are struggling to cope with their studies and the unique demands imposed by particular courses. Plenty of students try to develop efficient study skills and acquire appropriate learning strategies and in this respect they are offered a large number of coaching and academic courses dedicated to developing their study techniques, such as Effective Academic Writing or Effective Communication: The Art of Oral Presentation. However, students show a great deal of individual differences in their approaches to learning, and so do their teachers in teaching strategies. The utility of matching teaching strategies to learning style preferences has been widely debated, but when students are presented with learning new and difficult information, research shows significant improvement when individual learning styles are matched to instructional strategies (Dunn & Griggs, 2007).

The question is whether the students' learning style (LS) patterns are different in the various education programs. If educators in higher education understand learning styles at a group level and takes this into account and if students assimilate knowledge at the individual level, some positive results could be achieved. Educational programs could be more effective because you can "customize" them, students' performance can be improved, student throughput can increase, which in itself is positive from an economic perspective. Another important aspect of embracing learning styles is that students' meta-cognitive skills can be developed and thereby lay a solid foundation for lifelong learning.

As there have been plenty of discussions about the appropriate instruments assessing LS preferences the aim of this study was primarily to examine differences and similarities in two renowned instruments (Felder-Soloman's Index of Learning Styles - ILS and Johnston-Danton's Learning Combination Inventory - LCI) and consequently to prove current way of LS preferences evaluation depending on the field of study in a group of the tertiary bachelor students or to recommend a more suitable instrument.

2. Methodology

2.1. Two instruments assessing learning style preference

The research was based on two following LS instruments.

Johnston-Danton's Learning Combination Inventory - LCI

The interaction of cognition, conation, and affectation forms four patterns of learning behavior; sequential, precise, technical, and confluent. (Johnston & Danton, 1996) Sequential: following a plan. The learner seeks to follow step-by-step directions, organize and plan work carefully, and complete the assignment from beginning to end without interruptions. Precise; seeking and processing detailed information carefully and accurately. The learner takes detailed notes, asks questions to find out more information, seeks and responds with exact answers, and reads and writes in a highly specific manner. Technical; working autonomously, "hands-on," unencumbered by paper-and-pencil requirements. The learner uses technical reasoning to figure out how to do things, works alone without interference, displays knowledge by physically demonstrating skills, and learns from real-world experiences. Confluent; avoiding conventional approaches; seeking unique ways to complete any learning task. The learner often starts before all directions are given; takes a risk, fails, and starts again; uses imaginative ideas and unusual approaches; and improvises.

The LCI has twenty eight Likert scale (5 point), forced choice, tick box questions which are well matched to the learning objectives of the group based Design Build Test (DBT) projects. The questions focus on identifying preference in specific circumstances, for example "I would rather draw or build a model than read or write about a subject". The questions relating to the different learning styles are

not obvious to the student as they are irregularly mixed throughout the questionnaire. Totals are calculated using a separate guide sheet which the students do not see beforehand.

Preference between four learning styles; Precise, Sequential, Technical & Confluent processor, can be identified by four LCI totals represented by integer values between 7 and 35. John Johnston describes the four learning styles in the following terms: “A sequential processor is an individual who prefers clear and explicit directions/instructions in approaching learning tasks. Sequential processors need to be organised, to work neatly and methodically and to have the time necessary to complete tasks to their satisfaction.

Precise processor's predilection is for gathering, processing and utilising lots of data, and this gives rise to the asking and answering of many questions and to a preference for demonstrating learning through the writing of answers and factual reports. Technical processor on the other hand is much less comfortable with writing, preferring hands-on experience with relevant materials and problem-solving tasks to which his or her own solution-forming strategies can be distinguished and applied. Technical processors tend to be challenged, independent and often private thinkers. Confluent processor is creative and imaginative, has a strong preference for seeing 'the bigger picture' and enjoys finding and making the widest connections between ideas or phenomena.”

Individual LCI totals in each of the 4 styles indicate whether a student is liable to avoid, use as needed or strongly favor each of the styles. (Table 1)

Table 1. Interpretation of Learning Combination Inventory Totals

LCI Total	Interpretation
7-17	“I avoid this action tendency wherever possible. This is not really me.”
18-25	“I use this as needed.”
26-35	“I strongly favour this action tendency. This is typically me.”

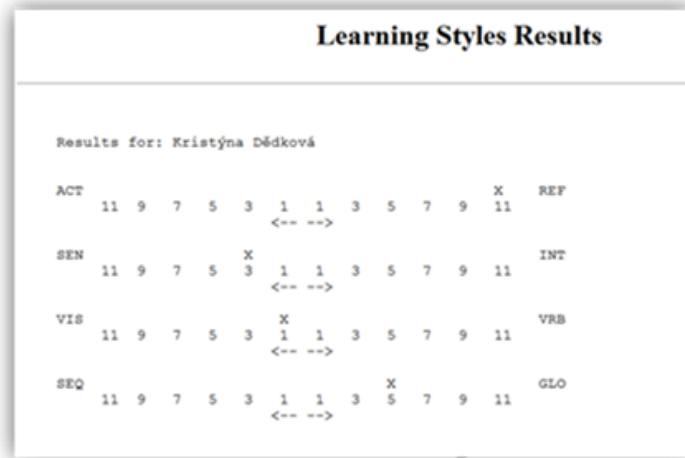
Using the Learning Combination Inventory, teachers can measure the degree to which a student uses or avoids each pattern. To complete the LCI, students select one of five responses, ranging from "Never Ever" to "Always" for 28 descriptive statements.

Felder-Soloman’s Index of Learning Styles - ILS

The Felder-Solomon’s Index of Learning Styles is a self-scoring web-based instrument that assesses preferences on the Sensing/Intuiting, Visual/Verbal, Active/Reflective, and Sequential/Global dimensions. The forty-four multiple choice questions in the questionnaire reflect the psychological and behavioral characteristics of four dichotomous dimensions of learning styles mentioned above. Questions in this questionnaire are written in English and the two choices in each question reflect the two dichotomous learning styles. For example, in the question “When I am learning something new, it helps me to (A) talk about it, (B) to think about it”, this question is trying to distinguish whether the student is more an active learner or a reflective learner.

Students indicate their preference to either of these two answers depending on their normal practice. After submitting their answers, students are provided with Learning Style Results, (see Fig.1) where if their score on a scale is 1-3, they are considered fairly well balanced on the two dimensions of that scale. If their score on a scale is 5-7, they have a moderate preference for one dimension of the scale and will learn more easily in a teaching environment which favours that dimension and if their score on a scale is 9-11, they have a very strong preference for one dimension of the scale and are classified as purely a single style learners, which may cause struggling and suffering when learning in an environment which does not support their preference.

Figure 1: Learning Styles Result



1.1. Research Sample

The LCI differs from other widely used inventories in emphasizing not the product of learning, but the process of learning. It focuses on how to unlock and what unlocks the learner’s motivation and ability to learn, i.e. on the way how to achieve student’s optimum intellectual development (Simonova, Poullova, & Stava, , 2013). 209 first to third year students from Faculty of Informatics and Management, University of Hradec Kralove participated in the specific-research project. These Focus group students contained students from four difference study fields: Information Management, Applied Informatics, Tourism Management, and Sport Management, see. Figure 2 and Figure 3. Their learning style was determined by the adapted LCI in Czech language. The LCI data were statistically processed, and following results were received.

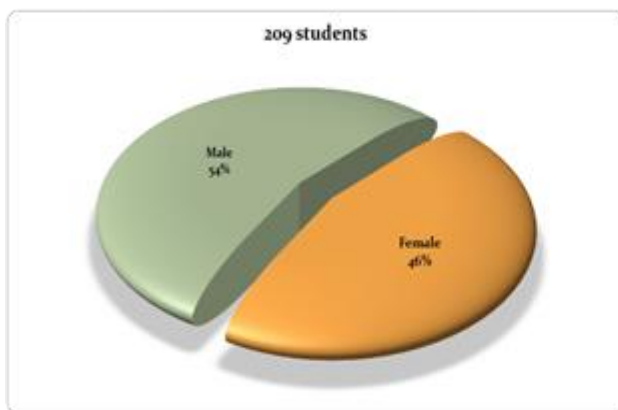


Figure 2: Gender of students participating in research

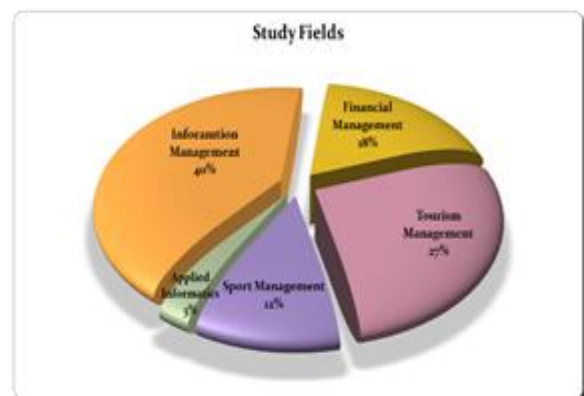


Figure 3: Study field of students participating in research

2. Research Results

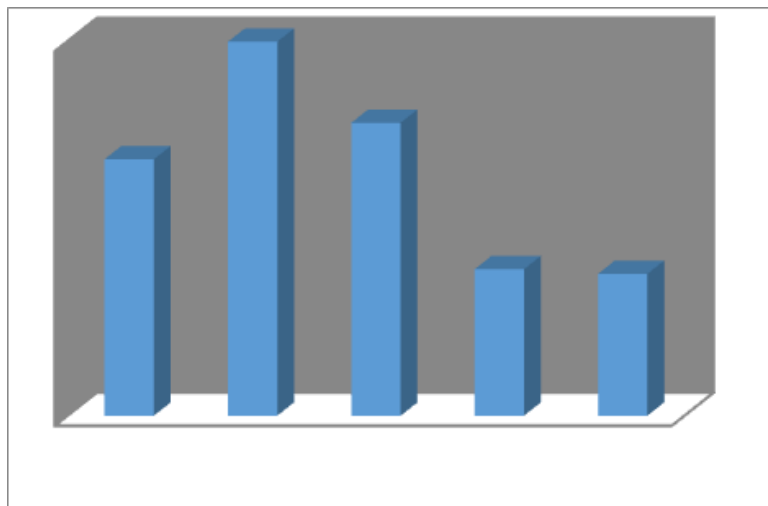
1. Johnston-Danton's Learning Combination Inventory - LCI

Focus group students are predominantly sequential and technical processors; female students tend to be significantly more sequentially orientated, however, they indicate less inclination to practical and individualistic processes, as well as to collecting data and innovations.

Taking into account the field of study, the strongest sequential processors are students of Tourism Management as opposed to students of Information Management, as expected, students of Applied Informatics are strong technical processors and quite surprisingly most confluent processors are students of Sport Management.

Based on the obtained LCI data and teaching practice we can claim that students more frequently work with theoretical facts, concrete instructions, principles, rules and restrictions, which do not provide much space for creative approach. This is in contradiction with the fact that FIM students (students of IT technologies) are expected to be creative, think independently, work with technical data and keep technical restrictions, or solve new problems and tasks.

Figure 4. Study material preferen



If individual LCI learning styles are considered, the received relation between types of study materials and patterns are presented in Figure 4. The results prove the Sequential Processors mostly use texts and video-recorded lectures; they accept animations and presentations but deny work with glossaries. The Precise Processors prefer work with animations, texts and glossaries; they dislike video recorded lectures. The Technical Processors often use animations, video-recorded lectures and presentations; they accept glossaries, however, they do not work with texts. The Confluent Processors are creative, independently working individuals who do not prefer any of the provided type of study materials. These Confluent Processors students based on our long term teaching experience these are predominantly students who depend solely on their memory and lesson notes and in most cases do not finish their studies successfully.

2.Felder-Soloman’s Index of Learning Styles results

The Index of Learning Styles combines three facets of learning styles: Personality, learning modality, and cognitive processing. (Felder & Soloman, 2002) This instrument allows a multi-modal approach. That is the reason why especially this instrument has been widely used to detect our students’ learning style preferences. The participants in this part of the study were 223 first and third-year college students who majored in two disciplines including Management of Tourism (n=172), and Applied Informatics (n=51). Among the participants, 83 were males and 140 were females. The study was conducted during the first semester of the 2014/15 academic year.

Students who participated in professional English language courses were asked to take part in the survey and fill out the Index of Learning Styles questionnaire which was uploaded to the on-line English language course in Blackboard LMS. It took the participants an average of 50 minutes to complete the questionnaire.

Figure 5 shows the percentages of participants displaying their preference to Active-Reflective, Sensing-Intuitive, Visual-Verbal, and Global-Sequential dichotomous learning style dimensions. A large number of students share preference to Sensing (185 students – 83%) and Visual (172 students – 80%) dimensions of learning style. There are, however, considerably large groups of students displaying preference to Sequential (131 students – 59%) and Active (125 students – 56%) dimensions of learning style (LS). Another relatively large group is the one containing students with Reflective (98 – 44%) and Global (92 – 41%) preferences. Verbal (44 - 20%) and Intuitive (38 – 17%) students belong to a minority.

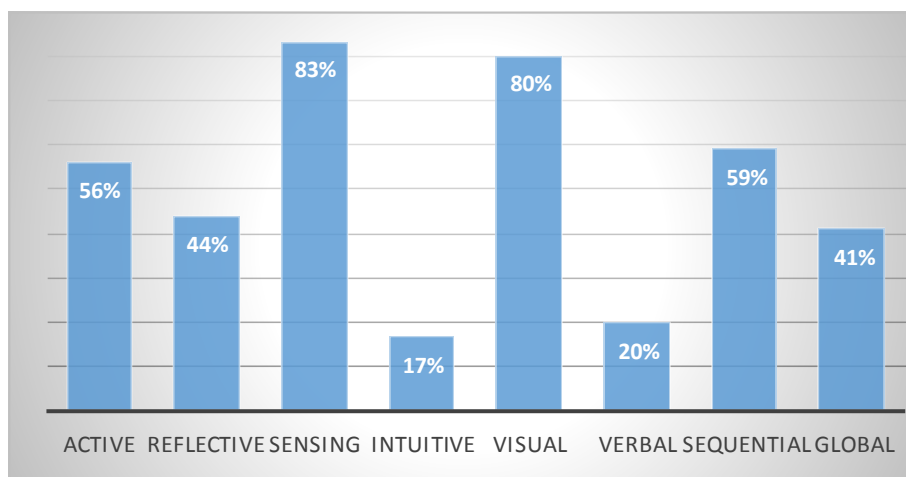


Figure 5. ILS preferences in % out of 223 students taking part in research

Based on the questionnaire administered among the students we searched for the correlation between digital media and preferred learning styles, see Fig.6.

		Learning Styles							
		sensiti	intuiti	visual	verbal	active	reflect	seque	global
Digital media	animations	👍		👍					
	text			👍			👍	👍	
	power-point			👍			👍	👍	
	video			👍	👍				
	eBook			👍			👍	👍	

Fig. 6. LS dimensions and digital media relationship

As most of our management and IT students seem to prefer sensing and visual learning styles (see Fig.5.), we can see that animations, pictures and graphs are for majority of our students the best ways of instruction in the process of learning and teaching.

3. Discussion and Conclusion

The results of our study proof that students of above mentioned study fields (Information Management, Applied Informatics, Tourism Management, and Sport Management) differ in their learning style preferences, no matter which assessing instrument for learning style detection we use. The most important for us, teachers and researchers is that based on the data informing us about our students learning styles, we can choose corresponding teaching strategies as well as relevant didactic materials used either in class or in our e-courses and blended courses. In the Faculty of Informatics and Management majority of students, who are technically oriented, seem to be sequential and technical processors with visual and sensing LS preferences. Both groups prefer visual materials and digital media. The implication for teachers in our faculty is that following the prevailed learning styles we can design and update not only our in class (face-to-face) instruction but also existing and newly designed e-learning courses, which are becoming inevitable, part of tertiary education.

Results from this study illustrate implications for both teachers and researchers interested in studying learning styles. In relation to the use of instruments, this study points out that certain instruments are more commonly used than other instruments in the field of tertiary education. It is important for researchers to select instruments based on reliability and validity and care should be taken especially to the study field and students' background.

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