



P-ISSN: 2394-1685  
E-ISSN: 2394-1693  
Impact Factor (ISRA): 5.38  
IJPESH 2018; 5(2): 276-280  
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www.kheljournal.com  
Received: 15-01-2018  
Accepted: 16-02-2018

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## Conceptions of learning chosen by pedagogy and physical education students

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### Abstract

In this paper, the results of study, which aimed at investigating students' opinion on learning, are discussed. The study involved pedagogy students of the first year at the Angelus Silesius State Vocational College (SVC), physical education students of the first year at the Paweł Wołodkiewicz College in Płock (PWC), and pedagogy students of the first year at branch of SVC in Wyszaków. COLI inventory with six categories of the conceptions of learning was used. This questionnaire was designed by Säljö (1979 a, b) and Marton, Dall'Alba and Beaty (1993). Analysis of the obtained data indicated that COLI inventory proved to be very useful tool in the recognition of conceptions of learning chosen by the examined students. Conception category C, describing learning as information reproduction, achieved the highest score in the group of the examined students. More detailed analysis showed that students of both sexes use qualitatively different categories of the conceptions of learning. Analysis of the obtained results indicated that in the group of female students learning was perceived as understanding (conceptions category D) while male students connected learning with information assimilation (conceptions category C).

**Keywords:** Conceptions of learning, hierarchical model of conceptions of learning, students' opinion, pedagogy and physical education students

### Introduction

People understand learning in various ways. One perceives it as a narrow reproduction of information. Other see in the process of learning an importance of understanding the material or the own development (Enwistle, 2005, p. 17) <sup>[4]</sup>. Therefore, conceptions of learning are subject of interest in several countries since late seventies of the XX century. People seek an actual meaning of the word learning accepted by everyone (Limberg, 1999) <sup>[7]</sup>. Several factors influence conceptions of learning and four of them are particularly important: 1) individual characteristics of the learning person, e. g. age, cognitive development, motivation, and perception of himself; 2) context of learning site, i. e. teachers' conceptions of teaching and learning, school culture, assessment of the cognitive achievements, teaching programs, applicable rules; 3) learner' home environment, especially conceptions of learning expressed by the family members; 4) cultural background, i.e. society's cultural beliefs and expectations. Classification system of learning conceptions was developed by the Swedish researcher Säljö in 1979 <sup>[15]</sup>. He carried out empirical studies, using survey technique to find possible developmental differences in conceptions of learning in a group of 90 individuals with different experience in learning. Selecting persons for his study, he used 2 criteria: 1) age (from 15 years and 7 months to 73 years and 3 months), and 2) level of the formal school education (minimum 6 years and maximum 16-17 years) (Säljö, 1979 a, b) <sup>[15, 16]</sup>. The author, basing on the detailed analysis of the obtained data, showed that the examined individuals differed markedly in understanding conceptions of learning. He found that conceptions of learning could be classified into five categories. These categories consisted hierarchical system, meaning that more complicated conceptions contained and expanded meaning of these in the lower steps in the hierarchy. In the lowest level of this hierarchy, was a category which defined learning as quantitative increase in the knowledge. More complex conceptions defined learning as a process including qualitative or transformative changes in the understanding a phenomenon or different seeing the topic. In 1993, Morton, Dall'Alba and Beaty added the

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sixth category to this hierarchical system presented by Säljö (1979 a, b) <sup>[15, 16]</sup>, i. e. learning understood as a development (changing) of the learner.

The Säljö (1979 a, b) <sup>[15, 16]</sup> and Morton, Dall' Alba and Beaty (1993) hierarchical expanded model of learning conceptions (HEXMLC) contains six following categories:

- A. Quantitative increase in information, which learner is aware of;
- B. Memorizing information, which may be reproduced;
- C. Absorption of information, which may be retained and used, if necessary;
- D. Understanding this, what may be learnt;
- E. Interpretation process aimed at understanding reality;
- F. Changing (development) the person, who is learning.

Category F of this hierarchy includes remaining five categories. Similarly, category C includes categories A and B. If C category is the highest indicated by the student, it means that it is rather unlikely that the student see the process of learning as a process of understanding (conception D) or as an interpretational process aimed at understanding reality (conception E) (Shale, Trigwell, 2018) <sup>[17]</sup>.

First three categories of conceptions of learning (A, B, and C) in HEXMLC model describe process of learning as reproduction of an information. Remaining three categories (D, E, and F)-as knowledge transformation. Conceptions connected with information reproduction are treated as surface approach, whereas those related to the knowledge transformation-as deep (Van Rossum, Schenk, 1984) <sup>[22]</sup>. Surface approach is connected with a trend to literal memorizing and reproduction, regarding learning as less or more passive transmission of an information "written" in the student's mind, whereas deep approach is a tendency to understand and bring out the meaning of the obtained information (Morton, Säljö, 2005, p. 56; Rodrigez, Cano, 2006, p. 619) <sup>[9, 14]</sup>.

In 1984-2011, studies on the approaches to learning of the students in primary and secondary schools were subject of interest of many researchers. In several these studies, model HEXMLC was used. Results of the carried out studies, depending on the learning stage, showed that the approach to learning of the examined students was consisted to the conception categories A, B, and C related to the surface, reproductive approach as well as categories D, E, and F, which are higher levels in HEXMLC model, i. e. deep approach to learning. Out of the countries carrying such studies, using survey technique, besides Poland [Sztejnberg, 2009; Szejnberg, Hurek, 2009] <sup>[19, 20]</sup>, there are: Great Britain, China, China (Hong-Kong), Finland, Belgium, Israel, Portugal, Taiwan, Sri Lanka (Abhayawansa, Fonseca, 2010; Duarte, 2007; Entwistle, 2005; Hadar, 2009; Marton, Dall' Alba, Beaty, 1993; Marton, Säljö, 2005; Morgan, Beaty, 2005; Paakkari, Tynjälä, Kannas, 2011; Richardson, 2011; Tsai, 2009; Van Rossum, Schenk, 1984; Watkins, 2004; Zhu, Valcke, Schellens, 2008) <sup>[1, 2, 4, 6, 4, 10, 12, 13, 21, 22, 24, 25]</sup>.

Students of both primary and secondary schools during education may show cognitive activity of different degree and its direction may be different, depending on the type of the tasks. Some students try to literary remember taught material. Later, they try to reproduce remembered information in the same form as it was taught. Other students try to understand the meaning of the remembered information. Others during learning use remembered information in various situations, known from classes and after-class activities (Szejnberg, 2006; pp. 33-64) <sup>[18]</sup>. As some categories of learning

conceptions included in HEXMLC, describe learners behavior during learning, it was interesting to find with which categories of this model the students of the first year of the undergraduate studies identify.

This study aimed at identifying what meaning students confer to the "learning conception". An answer to the following questions was sought:

1. Which category of learning conception in HEXMLC model choose the whole group of the examined students and which one student differentiated by gender?
2. Are differences in mean scores assigned by male and female students to each category of learning conception in HEXMLC model statistically significant?

### Material and Methods

The samples for this research included 121 students-35 male (28.93%) and 86 female (71.07%) students from two higher schools-the Angelus Silesius State Vocational College in Wałbrzych (SVC), and the Paweł Włodkowicz College in Płock (PWC). Fifty students of the first year Pedagogy Faculty at SVC participated in the study. This group included 15 male students, aged between 19 and 34 years (M =23.27; SD =3,61) and 35 female students, aged between 19 and 30 years (M =21,29; SD =2,02), while the group of students of the first year of Physical Education Faculty at PWC included 51 persons: 20 male students of the first year of the Physical Education, aged between 19 and 32 years (M =21,10; SD =3,19), and 31 female students, aged between 19 and 52 years (M =26,06; SD =8,50). In this group 8 females, aged between 19 years and 21 years (M =19, 88; SD =0,99), studied Physical Education, while 23 females, aged between 19 and 52 years (M =19, 88; SD =0,99) studied Pedagogy.

A conception of Learning Inventory (COLI) was used for survey. The students were asked to mark in a 5-step scale, how each of the HEXMLC category is near their opinion about learning. Categories contained in COIL were defined by Säljö (1979) <sup>[15]</sup> and Morton, Dall' Alba and Beaty (1993) <sup>[8]</sup>. Used in the study inventory is show below. Besides an instruction for students, it contains conceptions of learning categories ranged as follows: 1. (B); 2. (F); 3. (A); 4. (C); 5. (D), and 6. (E).

### Instruction for a student

What you mean by the term "LEARNING"?

Analyze the below phrases and assess, how near is everyone to your opinion about learning. Use the following scale: 5= very near to my opinion; 4= near; 3= not near and not far; 2= far; 1= very far from my opinion.

Learning is:

(Please, enter chosen number: 5, 4, 3, 2 or 1 in the scale):

1. Memorizing an information, which may reproduced later.
2. Development (changing) of the learner.
3. Quantitative increase in information, which learner is aware of.
4. Absorption of information, which may be retained and used, if necessary.
5. Understanding this, what may be learnt.
6. Interpretation process aimed at understanding reality.

### Results

The obtained results were analyzed with various statistical analyses. Basic measures of central tendency and size distribution of measurements, such as score mean value of each category and standard deviations, were calculated. To define statistical significance of the difference between score

mean values assigned by male and female students, t-Student test was used (Freed, Ryan, Hess, 1991, pp. 369-370; Nowaczyk, 1985, p. 168) <sup>[5, 11]</sup>.

Mean (M) values and standard deviation values (SD) of the score of each conceptions of learning categories in HEXMLC model are shown in Table 1.

<sup>1</sup> Students of the I grade part-time studies in the PWC branch in Wyszaków.

**Table 1:** Mean values and standard deviations of the scores

Categories	M	SD
1. A	3.62	0.91
2. B	3.97	1.01
3. C	4.12	0.87
4. D	4.03	0.86
5. E	3.65	1.02
6. F	3.93	1.01

Analysis of the obtained data (mean value of the scores

**Table 2:** Significance of mean score differences assigned by both male and female students to each conceptions of learning category in HEXMLC model

Conceptions of learning category	Description	Male Students (N=35)		Female Students (N=86)		t
		M**	SD	M**	SD	
A	Quantitative increase in information, which learner is aware of	3.37	0.91	3.72	0.89	0.9488
B	Memorizing an information, which may reproduced later	4.06	1.00	3.93	1.02	0.6392
C	Absorption of information, which may be retained and used, if necessary	4.09	0.74	4.13	0.92	0.2287
D	Understanding this, what may be learnt	3.51	0.82	4.24	0.78	4.5993*
E	Interpretation process aimed at understanding reality	3.57	1.09	3.69	1.00	0.5830
F	Development (changing) of the learner	3.86	0.88	3.95	1.06	0.4436

\* -t- statistically significant > critical value  $t_{0,05,df=120}$  (= 1.98).

\*\* -5-very near to my opinion, 1-very far for my opinion.

Analysis of the mean values of the scores assigned by the students to each categories of learning conceptions showed that male students gave highest score to C category (M =4.09; SD =0.74). They perceived learning as information absorption. Female students the highest score gave category D (M =4.24; SD =0.78). They treated learning as a process of understanding.

In case of category D, difference in the score mean values assigned by both male and female students proved to be statistically significant as t value was 4.5993, higher from the critical value  $t_{0,05,df=120}$  =1.980 (Freed, Ryan, Hess, 1991, p. 370; Nowaczyk, 1985, p. 265) <sup>[5, 11]</sup>. Female students assigned to this category of learning conceptions higher score that male students. Difference in score mean values assigned to remaining five categories (A, B, C, E and F) by the examined students differentiate by gender were statistically insignificant.

## Discussion

In spite of the fact that acknowledge of student' opinion about conceptions of learning is a subject of interest in many countries, in the Polish literature there are not studies, in which the examined individuals were differentiated by the gender and expressed their opinions about categories of learning conceptions in the HEXMLC model. Previous two studies with this model use were carried out in The Opole University. The first study included students of the III and IV year of Chemistry Faculty in school year 2005/2006 (Sztejnberg, 2009) <sup>[19, 20]</sup>, and the second-students of the first year of Pedagogy Faculty at the same university (Sztejnberg,

assigned by each conceptions of learning category, shown in Table 1, indicate that the highest mean score all examined students assigned to category C (M =4.12; SD =0.87). Learning according this conceptions category is absorption of information, which may retained and used, if necessary. This conception of learning as defined as the surface approach to learning, describe it as an information reproduction. The lowest mean scores (M =3.62; SD =0.91) all examined students assigned to category A, the lowest one in hierarchical HEXMLC model. It means that all examined students do not see learning as quantitative increase in information, which learner is aware of.

More detailed analyses were carried out to obtain an information, which conceptions of learning from HEXMLC model choose the examined students depending on their gender. Therefore, mean values of the scores assigned by male and female students to each conception of learning category, and statistical significance of the differences were evaluated. Results are presented in Table 2.

Hurek, 2009) <sup>[19, 20]</sup>.

This study aimed at recognition the meanings assign to the term "learning" by the students of the first year Pedagogy and Physical Education Faculties at SVC and PWC. The obtained results showed that COLI inventory proved very useful tool in the choice of conceptions of learning category in HEXMLC model consistent with the examined students' opinion.

Analysis of the obtained data showed that the students assigned the highest scores to C category, meaning that learning is an information absorption. More detailed analyses indicated that female students have chosen category D-fourth in HEXMLC hierarchic model, i. e. process of understanding information. It means that the examined male students gave the term "learning" different meaning than the female students. Male students choosing category C preferred surface approach to learning, treating learning as reproduction of an information. In consequence, such approach to learning may lead to lower notes during examinations (Entwistle, Entwistle, 2003; Vermunt, 2005) <sup>[3, 23]</sup>. Female students, choosing D category, were directed to the deep approach to learning connected with a transformation of information. In 2009, in one study that included 113 students (101 female and 12 male students) of the I year of Pedagogy Faculty of the University of Opole (undergraduate studies) a version of COLI was used. The examined students were asked to mark one of six categories of conceptions of learning of the model HEXMCL, which was the nearest to their opinion about learning. Students marked it as "1" and the remaining categories which did not expressed their opinion as "0" (Sztejnberg, Hurek, 2009) <sup>[19, 20]</sup>. An analysis showed that conceptions A, B and C

characteristic for a surface approach was chosen by 58 students (51.3%), and 55 students (48.7%) chose categories D, E and F, representing deep approach to learning-55 students (48.7%) (Sztejnberg, Hurek, p. 183).

Results of other studies, which aimed at recognizing conceptions of learning identical with the students showed that their thinking about learning changes with time. Students of the first year of studies think different than those of the higher grades. The results of one study involving the first year students of Beijing University and Flemish students of the first year Ghent University in Belgium showed that Chinese students used conceptions of learning in which an accent was placed on the information understanding and use than Flemish students (Chinese students  $M = 4.94$ ;  $SD = 0.89$ ; Flemish students  $M = 4.65$ ;  $SD = 0.64$ ;  $F_{0.01, Df = 729} = 31.85$ ). However, no statistically significant differences concerned a conception, in which learning was treated as memorizing of the taught material (Zhu, Valcke, Schellens, 2008, p. 124) [25]. The results of another study including the students of chemistry has shown that if for students of the III year learning most frequently meant understanding (category D in the HEXMCL model), the students of the IV year saw it as changing (development) the learner (category F) (Sztejnberg, 2009, p. 99) [19, 20]. Similar conclusions drew also Morgan and Beaty (2005) [10]. Confrontation of the results of the survey with the use of HEXMCL model showed that the students passing from learning as memorizing to understanding during their studies. At the end of the IV grade of studies, large group of the university students identified with <sup>2</sup> in this study a COLI (The Conceptions of Learning Inventory) was used. It contains 32 statements grouped into six subscales. Responders marked in a 6-step Likert scale the range of an agreement with each statement [Zhu, Valcke, Schellens, 2008, p. 122] [25].

Learning as interpretation process of the learnt material (category D) and learning as interpretation process, which aimed to understand reality (category E).

There were also students, who treated learning as changing (development) of learner (category F) (Morgan, Beaty, 2005, p.235) [10].

## Conclusions

An analysis of the obtained data enables to draw the following conclusions:

1. Male students of the I year of Pedagogy and Physical Education Faculties at PWC and SVC and its branch connected learning with an absorption of information, while female students of the studies as a process of understanding.
2. Difference of mean values of the scores assigned by the examined students differentiated by gender was statistically significant only for category D. Female students gave this category higher scores than male students.
3. COLI with categories of the learning conceptions in HEXMCL model may be used in the identifications of meanings assigned to learning by learners.

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