

A constructivist approach in teaching in higher education for getting methodological and reflection competences

Baiba Briede¹ Dr. paed.; **Ludis Pēks**² Dr. paed., Dr. sc. ing.

Latvia University of Agriculture Institute of Education and Home Economics, Latvia
baiba.briede@llu.lv¹; ludis.peks@inbox.lv²

Abstract: A constructivist approach in education as a paradigm shift from teaching to learning with an emphasis on active individual's intelligence organization and immediate construction of new information to experience is a quite serious challenge in contemporary higher education. Therefore the aim of the article is to highlight the principles of the constructivist approach in relation to the development of methodological and reflection competences. The method of questionnaire was used to investigate the students' self-evaluation on the development of the competences in various study courses. The main results of the study were obtained from the fields of production and processing, architecture and construction, education and economics students of Latvia University of Agriculture. The students marked high, medium and low obtaining level of methodological and reflection competences, and results could be used in the revision of planned results of study courses and implementation of methods and content promoting the competences.

Keywords: methodological and reflection competences, metacompetence, a constructivist approach.

Introduction

Development of competence is the aim and a planned result of each study programme and course. The aim of the article is to reflect the results of first year students' opinion on getting of methodological and reflection competences.

Constructivism principles help to understand and evaluate competence development with a teacher in the role of a facilitator in positive and supportive learning environment. A constructivist approach in education emphasizes active knowledge construction on the basis of self-experience. Constructivists' perspective is abandoning transmission of information from a teacher to a student and therefore reflection and methodological competences is a feature of knowledge which is developed meaningfully by an individual based on self-experience and thinking about it. The students develop their ability to control their own learning, improve learning skills and assess their learning outcomes.

Constructivism is an appropriate basis for successful development of all types of competence, int. al. metacompetence as well because the main idea of it is an individual's ability to act demonstrating one's potential.

Methodological and reflection competences which in one word are often called as metacompetence reflects holistic approach towards an individual's potential. Therefore metacompetence comprises competences which allow the expansion of other individual's competences (professional, social, basic, individual). Metacompetence is the most general and through-composed competence serving as a guarantee for further actions in future situations. That is why the investigation data on the first year students' metacompetence development are indicators of their critical, systemic and creative thinking development.

Methodology

The questionnaire on the development of first year students' methodological and reflection competencies had been carried out. 71 student of Latvia University of Agriculture from the fields of food technology, landscape architecture, construction, education and economics at were questionnaired. The survey covered 45 study courses.

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L.Cohen, L.Manion and K.Morrison (2011) ethical issues and recommendations on operationalizing the questionnaire, and M. Siniscalco and N. Auriat (2005) guidelines for writing questions were used as keeping the vocabulary simple and the questions short, avoiding of: double-barrelled, hypothetical questions and double negatives, overtaxing of the respondent's memory and overlapping response categories.

Table 1

First year students' evaluation of the development of their methodological and reflection competences

Indicators		Evaluation					
		High	Medium	Low	Σ	N_{\max}	$N_{\Sigma}, \%$
1. Methodological competence	N	5431	5432	5433	5434	880	49
	%	56	33	11	100		
2. Reflection (self-)	N	10886	10889	10892	10895	880	35
	%	64	31	5	100		
3. Reflection (local, global coherences)	N	16367	16372	16377	16382	880	47
	%	42	56	2	100		
4. Independent thinking, taking decisions, understanding -self	N	21874	21881	21888	21895	880	47
	%	81	17	1	100		
Totally 1 - 4	N	27407	27416	27425	27434	3520	45
	%	61	34	5	100		
Other 9 indicators	N	32966	32977	32988	32999	7920	57
	%	66	26	8	100		
Totally (13 indicators)	N	38551	38564	38577	38590	11440	53
	%	65	28	7	100		

N – number of the indicator's evaluations; N_{\max} – maximally possible number of the indicator's evaluations which is determined by multiplying the number of study courses and respondents in each of five study fields (food technology, landscape architecture, construction, education and economics) and summing the four multiplications; $N_{\Sigma}, \%$ - actual number of the indicator's evaluations put into per cents from maximally possible number of the indicator's evaluations, which describes the study courses' potential implication opportunities on the development of competences.

The study courses' potential implication opportunities on the development four methodological and reflection competences indicators are lower (45%) than on other indicators (57%).

Testing with chi-square tests (Preacher, 2001) it is established that the fourth indicator's evaluation data distribution differ statistically significantly ($p < 0.00$) from other evaluations data distributions. Four methodological and reflection competences indicators in comparison with other indicators have relatively seldom evaluation *high* (61%) but the evaluation *medium* (34%) occurs more often (Table 1). Differences of data distribution of evaluations of the indicators as *methodological competence*, *reflection* and *independent thinking, taking decisions, understanding -self* are statistically important ($p < 0.00$). The evaluation - *high* 81% of the indicators as *independent thinking, taking decisions, understanding -self* – is relatively higher.

Results and discussion

Competence is a wide and developing concept comprising the development of the individual's potential. Competence as a complicated entity has to be distributed in several overlapping competences with the purpose to emphasize the developmental opportunities of the individual's

potential. Competence can be divided into: meta, key, social, professional and self-competence. (Figure 1).

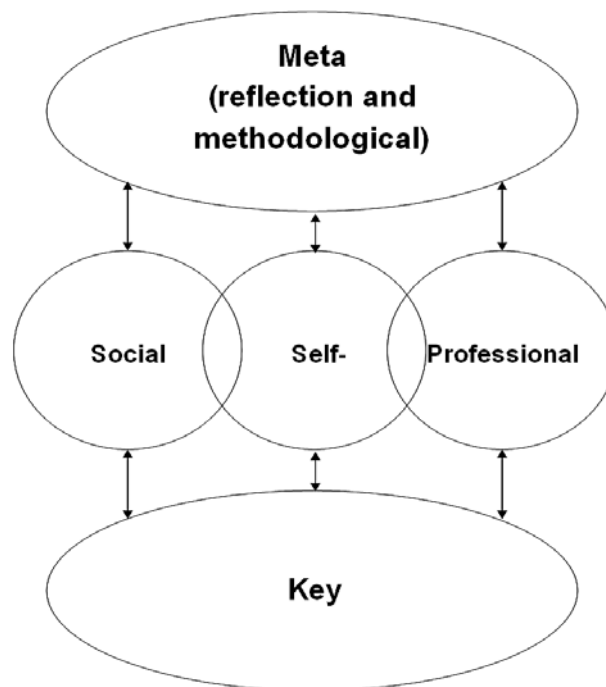


Fig.1. Coherences among competences

Key competences comprise essential knowledge, skills and attitudes for lifelong learning related to the following competences: „1) Communication in the mother tongue; 2) Communication in foreign languages; 3) Mathematical competence and basic competences in science and technology; 4) Digital competence; 5) Learning to learn; 6) Social and civic competences; 7) Sense of initiative and entrepreneurship; 8) Cultural awareness and expression” (European Commission, 2007, 7).

Self-competence expresses as an individual’s capability to judge and take decisions independently, understand himself/herself.

Social competence includes such competencies as co-operation, communication, competitive capacity and also self-competence (Halfpap, 1992; Keller, Novak, 2000) as well as it is described as a part of civic maturity which is demonstrated as an individual’s capability to take decisions and manage particular social and business situations in compliance with conditions (Keller, Novak, 2000).

R.Garleja describes social competence as a „personality readiness to adapt to social environment, act in particular social conditions, nonstandard situations” (Garleja, 2006, 31).

Professional competence is a research object both in professional organizations and by theoreticians. Its demonstration shows an individual’s capability including such aspects as continuous integration of contemporary and scientific cognitions in professional action, consulting and expertising, considering of Professional ethics, etc. R. Garleja emphasizes that professional competence is a capability to perform in the frame of one’s occupational functions considering values, select knowledge and develop skills, integrate knowledge and values with the purpose to achieve professional aims. Professional competence means that the individual is able to reflect analytically, model behaviour and material and abstract things, express views, systematize, organize, summarize data, etc. (Garleja, 2006).

The conception of meta-competence “refers to higher order, overreaching qualities and abilities of a conceptual, interpersonal, and personal/professional nature. This includes students’ cognitive, critical, and self-reflective capacities” (Bogo, Regher, 2006).

According to F. M. Orthey (Kniel, 2009) the conclusion is that topicality of the meta-competence refers to the new definition of an employee who “..should be jobholder who is capable of flexibly adapting to changing work requirements” (Kniel, 2009, 58) and “.. identification with the job and a disposition to solve professional problems” (Kniel, 2009, 58) are highly important in nowadays labour market. In

order to supply the employees qualities necessary for the labour market the following metacompetences put forward by Orthey are crucial:

“1. Plurality competence (management and acceptance of versatile situations)

2. Transfer competence (exposure to discontinuity)

3. Process structured related competences (formulation of a life concept on the basis of realistic (self) analysis” (Kniel, 2009, 58).

So the topicality of metacompetence is that an individual should be able to adapt flexibly to changing conditions and requirements and solve problems both in everyday and professional situations.

Reflection as a crucial element of metacompetence includes evaluation, prediction of consequences and appropriate judgement of an individual’s action and decisions. The individuals conclude, think over their experience and take new decisions in the the result of reflection.

J.Keller and F. Novak (2000) conclude that the question *how?* is in the centre of methodological competence, and it relates both to thinking and demonstration of competence in action.

Holistic approach towards an individual’s development is focussed on metacompetence as a result and process where both aspects are of high importance and they are one entity relates to constructivist approach. Constructivism as an education approach explains how humans construct knowledge on the basis of their existing experience and necessary means for the development of information construction ability. The main idea of constructivism is that an individual constructs one’s own knowledge and learning outcomes are personally important for the individual.

Constructivists emphasize the ability to construct knowledge and their perspective is abandoning transmission of information from a teacher to a student. „...the art of teaching then consists in the skill with which messages devoid of ambiguity are transmitted, the art of learning in the ever-increasing skill with which a receiver extracts the meaning of the message picked up by his her apparatus” (Larochelle, Bednarz, 1998, 3). Therefore it is student-centred learning with a crucial emphasis on learning skills.

E. von Glasersfeld (1998) substantiated that knowledge is the result of active cognizing and it is an adaptive process in relation to a particular environment and behaviour, and one’s experience is crucial in this process.

According to E. von Glasersfeld radical constructivism „puts forwards two main claims: knowledge is not passively received but actively built up by the cognizing subject; the function of cognition is adaptive and serves the organization of the experiential world, not the discovery of ontological reality” (Glasersfeld, 1989, 162).

Usage of the principles of constructivism including radical constructivism ideas promote the development of metacompetence because they emphasize active, critical and adaptive learner’s thinking (Briede, 2013):

- **learning occurs by merging new information with a learner’s prior experience and information technologies** as information management systems;
- **learning is an active social process** and a significant part of it occurs through interaction with a lecturer and students, and it is learning together in one community where each students has a possibility to develop his/her potential creating personal knowledge and social competence consciously;
- **learning is contextual** because students learn in coherence with their experience, prejudices, fear, views, etc., therefore learning is a social process and a part of their life, and success and mistakes are a feature of learning;
- **motivated learning when students find the meaning** of learning themselves in coherences with the essence of the course information;
- **students understand the „gap” between their actual knowledge and new knowledge they need to reach** and this cognitive dissatisfaction is an internal drive to reach a higher level of knowledge;
- **students have rights to express their opinions independently from their learning experience** therefore fostering their accommodation and assimilation process and explain new material in

their own words as well as promote understanding of the knowledge society aspects and values such as environment and green economy protection and management;

- **a lecturer has a role of a facilitator, coach, motivator and democratic style dominates in studies** to create a need for new knowledge;
- **much learning occurs through particular situations** by means of PBL, cooperative, exemplary, discovery, projects, etc. strategies **with an emphasis on learning by doing** promoting innovation, critical thinking, social and professional competence in the context of intellectual and human capital development in the knowledge society;
- **various kinds of evaluation as one of the means of developing critical thinking** is a part of a learning process: a lecturer-student, student-student and self-evaluation;
- **socially positive and updated learning environment** as learning technologies and e-learning technologies for the society and the humanity is an important factor for qualitative studies;
- facilitating students to monitor their learning process is an important means to develop their **learning skills which is a crucial feature for successful process of knowledge construction and involvement into the labour market**; employers note the capacity to learn as the most important generic competence for the university graduates.

The development of metacompetence reflects successes and shortcomings of the study process from various point of view because the essentials of this competence relate to an individual's thinking capabilities. Stating of metacompetence development also means stating of peculiarities of the study process including study methods, teacher's personality, didactical principles, etc. Therefore stating of actual development of metacompetence data analysis help to judge about necessary improvements of particular study courses.

Conclusions

- Constructivism principles is a means of successful development of metacompetence because they promote critically analytical thinking in coherences based on learner's self-experience as well as students can control their learning assessing the learning outcomes. The purposeful development of metacompetence serves as a condition of the development of social, professional and self-competence of students because it is an indicator of thinking abilities.
- Questionnaires on metacompetence should be carried out regularly because the results are indicators of learning process successes and shortcomings comprising overall qualities of the development of the individual's potential.
- Continuous development of metacompetence using the principles of constructivism promotes understanding of the individual's human capital opportunities in the frame of formal, non-formal and informal learning and promotes competence oriented systemic career guidance for sustainable development of knowledge society.

Bibliography

1. Bogo M., Regehr C. Woodford M., Hughes J., Power R., Regehr G. (2006). Beyond competencies: field instructors' descriptions of student performance. *Journal of Social Work Education*, 42(3): pp. 579–593. [online] [10.10. 2013]. Available at [\[Taylor & Francis Online\]](#), [\[Web of Science ®\]](#)
2. Briede B. (2013). A Constructivist Approach in Engineering Education. *Proceedings of the 12th International Scientific Conference Engineering for Rural Development*. Jelgava, pp. 584 – 589.
3. Cohen L., Manion L. & Morrison K. (2011). *Research methods in Education*. Seventh edition. Oxon, NY: Routledge, 758 p.
4. Garleja R. (2006). *Cilvēkpotenciāls sociālā vidē* (Human potential in social environment). Rīga, RaKa, 199 lpp. (in Latvian)
5. Glasersfeld E. von (1989). Constructivism in Education. In: T.Husen and T. Neville Postlethwaite (eds) *The International Encyclopedia of Education. Research and Studies*, Supplementary Volume 1. Oxford: Pergamon Press. pp. 162-163.

6. Halfpap K. (1992). Handlungsorientiertes Lernen in der kaufmannischen Berufsbildung: Wo-Wie-Wann-Warum? (Learning by doing in commercial vocational education training: where-how-when-why?) *Berufsbildung*, 46, 2, S. 81-84. (in German)
7. Keller J.A., Novak F. (2000). *Kleines pädagogisches Wörterbuch* (The small dictionary of pedagogy). Freiburg, Herder, Germany, 396 S. (in German)
8. European Commission (2007). *Key Competences for Lifelong Learning. European Reference Framework*. Luxembourg: Office for Official Publications of the European Communities, 12 p.
9. Kniel S. (2009). *Evaluating Intercultural Learning: Developing Key Skills through the International Dukenet Markstrat Programme*. Kassel: Kassel university press GmbH, 326 p.
10. Larochelle M., Bednarz N. (1998). Constructivism and Education Beyond Epistemological Correctness. *Constructivism and Education* (ed. by Larochelle M., Bednarz N., Garrison J.). New York: Cambridge University Press, pp. 3 – 20.
11. Glasersfeld E. von (1998). Why Constructivism Must Be Radical. *Constructivism and Education* (ed. by Larochelle M., Bednarz N., Garrison J.). New York: Cambridge University Press, pp. 23-28.
12. Preacher K. J. (2001). *Calculation for the Chi-square Test: An Interactive Calculation Tool for Chi-Square Tests of Goodness of Fit and Independence* [Computer software], [online] [06.03.2013.]. Available at <http://quantpsy.org>.
13. Siniscalco M. T., Auriat N. (2005). Questionnaire Design. *Quantitative research methods in educational planning*. Module 8, ed. K.N.Ross. UNESCO International Institute for Educational Planning. [online] [12.12.2011.] Available at http://www.iiep.unesco.org/fileadmin/user_upload/Cap_Dev_Training/Training_Materials/Quality/Qu_Mod8.pdf