

Table 4 showing that in case of Czech preservice teachers had personal relevance and critical voice had no differences, and also critical voice and uncertainty had no differences. While Thai preservice teachers had perception of personal relevance, critical voice and uncertainty had no differences.

Discussion

The classroom environment is may be looked different in the past due to the change in learning environment. In case of Thailand, Chamnanwong & Yuenyong (2014) investigated the science learning environment in Thai primary schools. The study indicated that constructivist science learning environment in different cultures and contexts allowed teachers to applying constructivist teaching into classroom. However, the study is descriptive research which the level of perception of preservice teachers are not reported. While preservice teachers act as key elements to engage constructivist science learning environment into classroom. That is, explorative study in terms of perception should be studied and explain by preliminary investigation. The level of perception constructivist science learning environment in Thai and Czech preservice teachers need to be improved and integrated by instructional strategies. Constructivist science learning environment is a means for facilitating students' learning of science, increasing participation of students to pay attention in the lesson.¹⁾ The finding relevant to the previous study in teacher preparation program Prachagool et al. (2016) discussed that teacher preparation program in Thailand was managerially controlled in standard of teaching by Teacher Council of Thailand (TCT). University and college that concerned teacher production encourage to the standard and quality which TCT required. This reason seems to relevant level of constructivist science learning environment for Thai preservice science teachers. The preparation program cannot deny how to develop preservice teachers to understand philosophy of education, have managerial skills in classroom, creative and problem thinking in classroom, and classroom research.²⁾

To the element, shared control of constructivist science learning environment, Czech and Thai preservice teachers had medium level of perception, other elements seem to differences. The remark of evidence pointed that personal relevance, uncertainty, critical voice, and student negotiation are differenced, Thai had high level whereas Czech had low level. Data is tested by national comparison also showed that Thai and Czech preservice teachers had differences perception of constructivist science learning environment. However, the exploration is a preliminary survey, constructivist view in difference sociocultural contexts offering by goal of teacher preparation program (Clift & Brady, 2005). Conditions of classroom for open discourse include atmosphere of trust and mutual respect influenced to beliefs (Taylor et.al., 1997). The finding needs to be more exploration how philosophy and practices engage preservice science teachers to enhance construct view in classroom. The constructivist learning seems to be different from those traditional instruction, the

constructivist learning environment science allowed theory that providing framework in the relation of sociocultural, environmental, and pedagogical contexts (Jonassen & Rohrer-Murphy, 1999).

The study found also that Czech and Thai preservice science teachers had different perception, that is, constructivist science learning environment concerned their scientific epistemological beliefs and perceptions of constructivist learning environments. They had epistemological beliefs to constructivist views, they also need to aware epistemological orientation towards scientific knowledge, and designing learning experiences (Tsai, 2000). However, the learning environments which constructivist views lead preservice teachers to positive attitudes. The attitudes toward learning experiences and designs can promote personal relevance, shared control with classroom and negotiate to their learning (Kim et al., 1999). The study was found that personal relevance, critical voice and uncertainty no means of differences. It was not surprised to these elements due to the participants had to be good teachers in the future, the program of teacher preparation encouraged them to classroom management by embedding beliefs and attitude towards learning management (Kim et al., 1999). They also learn to manipulate constructivist environments as well as nature of teaching in science (Beck et al., 2000; Aldridge et al., 2004; Ozkal et.al., 2009).

Constructivist science learning environment study from Czech and Thai reported that the different sociocultural contexts and educational policy to teacher preparation program can make preservice science teachers to explore their perception. This study is a preliminary investigation to bridging the gap of awareness in classroom management and pedagogy which teachers should have and should be professional. Personal relevance, critical voice, and uncertainty of elements showed no differences that make us to understand constructivist view in the teacher preparation program, curriculum and instruction, and nature of science teachers.

NOTES

1. <http://link.springer.com/article/10.1007/s10763-016-9772-4>
2. <http://teachercodes.iiep.unesco.org/teachercodes/codes/Asia/Thailand.pdf>

REFERENCES

- Aldridge, J.M., Fraser, B.J. & Sebela, M.P. (2004). Using teacher action research to promote constructivist learning environments in South Africa. *South Afr. J. Educ.*, 24, 245 – 253.
- Beck, J., Czerniak, C.M. & Lumpe, A.T. (2000). An exploratory study of teachers' beliefs regarding the implementation of constructivism in their classrooms. *J. Sci. Teach. Educ.*, 11, 323 – 343.
- Chamnanwong, P. & Yuenyong, C. (2014). Investigation of constructivist science learning environment in Thai primary schools. *Mediterranean J. Soc. Sci.* 5, 592 – 598.
- Clift, R.T. & Brady, P. (2005). Research on methods courses and field experiences (pp. 309 – 424). In: Cochran-Smith, M. & Zeichner, K. (Eds.). *Studying teacher education: the report of the AERA panel on research and teacher education*. Mahwah: Lawrence Erlbaum.
- Daher, W. & Saifi, A.-G. (2016). Democratic practices in a constructivist science classroom. *Int. J. Sci. & Math. Educ.* 1 – 16.
- Duit, R. & Treagust, D.F. (1995). Students' conceptions and constructivist teaching approaches (pp. 46 – 69). In: Fraser, B.J. & Walberg, H.J. (Eds.). *Improving science education*. Chicago: University of Chicago Press.
- Grisham, D.L., Laguardia, A. & Brink, B. (2000). Partners in professionalism: creating a quality field experience for preservice teachers. *Action Teach. Educ.*, 21(4), 27 – 40.
- Gruenewald, D.A. (2003). The best of both worlds: a critical pedagogy of place. *Educ. Researcher*, 32(4), 3 – 12.
- Jonassen, D.H. & Rohrer-Murphy, L. (1999). Activity theory as a framework for designing constructivist learning environments. *Educ. Tech. Res. & Dev.*, 47, 61 – 79.
- Kim, H.B., Fisher, D.L. & Fraser, B. J. (1999). Assessment and investigation of constructivist science learning environments in Korea. *Res. Sci. & Tech. Educ.*, 17, 239 – 249.
- Norris, S.P. & Phillips, L.M. (2003). How literacy in its fundamental sense is central to scientific literacy. *Science Education* 87, 224 – 240.
- Osborne, J. (2011). Science teaching methods: a rationale for practices. *School Sci. Rev.*, 93(343), 93 – 103.
- Ozkal, K., Tekkaya, C., Cakiroglu, J. & Sungur, S. (2009). A conceptual model of relationships among constructivist learning environment perceptions, epistemological beliefs, and learning approaches. *Learn. & Ind. Diff.*, 19, 71 – 79.
- Prachagool, V., Nuangchalerm, P., Subramaniam, G. & Dostál, J. (2016). Pedagogical decision making through the lens of teacher preparation program. *J. Educ. Gifted Young Scientists*, 4, 41 – 52.

- Taylor, P.C. & Fraser, B.J. (1991). CLES: an instrument for assessing constructivist learning environments. *Annual Meeting NARST*, April.
- Taylor, P.C., Fraser, B. J. & Fisher, D.L. (1997). Monitoring constructivist classroom learning environments. *Int. J. Educ. Res.*, 27, 293 – 302.
- Tenopir, C. & King, D.W. (2004). *Communication patterns of engineers*. Hoboken: John Wiley & Sons.
- Tsai, C.-C. (2000). Relationships between student scientific epistemological beliefs and perceptions of constructivist learning environments. *Educ. Res.*, 42, 193 – 205.

✉ **Dr. Prasart Nuangchalerm (corresponding author)**

Department of Curriculum and Instruction

Faculty of Education

Maharakham University, Thailand

E-mail: prasart.n@msu.ac.th