Responsive and Responsible Preservice Teacher Reflective Thinking Towards Chemistry for Life

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EXECUTIVE SUMMARY

This study aims to determine the relationship between preservice teachers' responsive and responsible learning skills attained in their university education along with their reflective thinking tendencies. The participants of this research were preservice teachers from the Education Faculty at Hacettepe University. Data were collected through the reflective thinking scale, and metaphors of preservice teachers about chemistry of daily life were collected through a diagram prepared according to the lotus flower technique. Both qualitative content analysis and statistical analysis were employed. It was found that most of the preservice teachers have basic reflective thinking at least at the intermediate level (habitual action, understanding, reflection, and critical reflection). This research also illustrates the need for practices such as responsive teaching and differentiated instructional practices. However, the limited studies on responsive and responsible learning poses a significant problem for chemistry education.

INTRODUCTION

Responsible learning has been one of the most popular concepts studied in the field of education in recent years. Responsible learning skills of individuals could or could not be improved within various processes during education at home or at school (Boyd, Mykula & Choi 2020). Therefore, teachers play a great role in developing the responsible learning skills of students (Boyd, 2016). Teachers are the leading actors within the education system as they play the crucial role in developing of a country, training qualified manpower, providing welfare and social peace in the society, socializing individuals as parts of

the community and transferring the social culture and values to younger generations (Villegas & Lucas, 2007). Teacher competence, as well as being extremely essential in education in a country, is the most prominent factor affecting the quality of education (Prater & Devereaux, 2009). In order to improve the level of teacher competence, which is an inevitable element of effective and qualified education, the construction of views and behaviors regarding teaching profession within the pre-service education is of great importance (Villegas & Lucas, 2002). Today, teachers are required to have better skills than transferring the content or attaining skills to students (Brookfield, 2015). According to the constructivist theory, each individual should be encouraged to participate actively in the learning process and be responsible from his/her own learning. This highlights the importance of teacher roles in Responsive and Responsible Learning Environment (Martin & Strom, 2016; Smith, et.al.2016). It is assumed that preservice teachers' have attained various personal responsive and responsible in chemistry education as a result of their communication or interaction with teachers with different characteristics or through their informal observations during their school years. Therefore, revealing and analyzing these perceptions attained by the preservice teachers has great importance. Studies have shown that the pragmatic philosophy matches with the innovativeness within teacher training process while reflective thinking as an important aspect of teaching is highly emphasized (Calderhead, 1989; Goodman, 1984; Kocak & Onen, 2011; LaBoskey, 1993). Definitions on reflective thinking involve style of thinking using a knowledge structure supportive of any thought, knowledge and reaching their expected outcomes in an effective, coherent, and careful way (Dewey, 1991; reported by: Unver, 2003; Semerci, 2007). Additionally, reflective thinking is known to have essential effects in education. Training programs, which improve reflective thinking contribute positively to preservice teachers' planning, application and evaluation processes as well as improving their reflective thinking skills (Kocak & Onen, 2012; Lim, et al., 2003; Norton, 1994; Schweiker et.al, 2003).

Today, the individuals are expected to produce knowledge rather than consume it. The individual that is accepted by the modern world is the one, who apprehends the knowledge learnt and participates effectively in the process of evaluating and commenting on it rather than being guided and shaped. The nature of knowledge and learning sets the basis of the constructivist learning, which has recently been appreciated (Brooks & Brooks, 1993). In this respect, students need to associate the concept they have learned to daily life in order to structure it in a meaningful way (Bernard & Mendez 2020; Demirdağ vd., 2010; İngenç & Aytekin, 2010; Koray et.al., 2007; Önder & Beşoluk, 2010; Özmen, 2003; Özmen &Yıldırım, 2005; Özsevgeç & Ürey, 2010). When the studies conducted to closen everyday life and science are examined, it can be seen that there are many interesting learning-teaching activities designed with items frequently used in daily life (Heimann & Müller, 2007; Kempke, & Flint 2021; Nashan et al, 2007; Sommerfeld, 2008; Vries et al., 2006). For instance, Ducci (2005) who contends that using everyday items as materials in chemistry classes would increase student motivation towards chemistry classes, has used kitchen items (lemons, jellybeans, raspberries) as indicators in student classes, and he achieved successful results. Likewise, Worn et al (1998) in chemistry classes they designed, managed to decompose bitter chocolate without using complex chemistry analysis procedures but just simple chemistry knowledge and acetone as chemical (Oil: 26%, Sugar: 48%, and Cocoa: %24). The experiment, which can easily be done in class, is designed so as to improve students' motivation and interest in chemistry courses.

Designing everyday-life-based chemistry classes is not limited to this. Moreover, there are fun and equally scientific chemistry classes where such everyday items as vitamin pills (Vries, 2002), pastilles, pills (Mönich et al., 2006), coke (Schunk et al., 2008), carbonate (Schmidt et al, 2002), jellybeans (Lemke,