

Images of Intellectual Capital

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Edited by

Jan Fazlagić and Arif Erkol

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THE ROLE OF CREATIVITY AND CREATIVE TEACHERS IN THE CURRENT EDUCATION SYSTEMS

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Abstract

Creativity and education did not always go in line. The current system of education is, to a large extent a continuation of the schooling system designed in Prussia in the 19th century where creativity of pupils was not encouraged by teachers but even penalised. Only in the last two decades did we see some structural changes in education systems across Europe and elsewhere aimed at making schools more supportive for the development of creativity. This paper describes some of the pending issues related to teacher education and education systems which should be focused on increasing creativity of pupils.

Keywords: Creativity, education, teaching methods.

Introduction

Creativity is a process which leads to the creation of a new product, idea or method. For a product to be 'creative' one important condition has to be met: it has to be widely accepted by a general audience. Of course, there are plenty of examples of creative products which were revealed to the public after the death of their creator (Fazlagić 2009, 2015). Creativity is subjective: a product can be creative for some period of time and then lose its value in the eyes of the audience. Creativity is defined not only by the outcomes but also, by the way individuals think. The judgment of creativity of teachers is difficult because of a professional distance between the service provider (the teacher) and the service recipients (the pupils). A similar situation can be observed in healthcare services where the patient is not able to fully judge the competence of the physician.

Therefore, using pupils as a conventional ‘audience’ to judge teachers’ creativity has some limitations. It is easier, however, to introduce a ‘mediating’ variable between the teachers’ creativity and the pupil; that is, the efficiency of teaching. The question is therefore not whether creative teachers are more valued by pupils, but to what extent the teacher’s creativity impacts on learning outcomes. This paper’s main goal is to review the concept of creativity from the perspective of teachers and education. The recent advent of creativity does not mean that creative teachers did not exist in the past, but our recent interest in creativity poses new questions:

- Why has creativity gained importance in education in recent years?
- To what extent can the creativity of a teacher be considered as a performance criterion?
- How does creativity transform into efficiency in teaching and vice versa (if it does at all)?

Research on creativity in education

Guilford (1950, 1967, 1973) is considered as the first scholar to have initiated systematic studies on creativity. He was examining the limitations of intelligence tests and investigated ‘divergent thinking’. There followed numerous research studies which aimed to assess and measure creativity, to identify characteristics of creative people and to foster it through specific teaching approaches. There have been many research studies on creativity over the past decades. They included the following: the measurement of creativity, methods of identifying creative individuals, predictors of creativity in early life, etc. According to Ann Craft (2001), four major lines of development can be identified, which are presented in Table 1.

Table 1. Major lines of development of research on creativity.

Line of development and key research question	Characteristics
Personality – what are the traits of creative people?	<p>Research is focused on developing a list of creative individuals. There are many different specifications depending on the author, but they usually include:</p> <ul style="list-style-type: none"> • Strong motivation • Perseverance/endurance • Intellectual curiosity • Deep commitment/passion • Independence in thought and action • Strong desire for self-realization • Strong sense of self • Strong self-confidence • Openness to impressions from within and without • Attracted to complexity and obscurity • Empathy/high sensitivity • High capacity for emotional involvement in their investigations • Self-control • Sustained hard work • Determination
Cognition – what happens in the mind of a creative person?	<ul style="list-style-type: none"> • Creativity as an aspect of intelligence • Creativity as a mainly unconscious process • Creativity as a problem-solving capacity • Creativity as an associative process • Thinking in opposites, analogies and metaphors • Intuition • Inspiration • Intelligence • Various processes of mental representation • Specific perception processes • Problem finding • Problem solving

<p>Ways to stimulate creativity – how to motivate creative people</p>	<p>There are many theories and models for motivating creative people. For example, Benjamin (1984) suggested that early family responsibilities and opportunities for independent action encourage creative achievement, and that creativity training programmes in schools are more effective when teacher involvement is high.</p>
<p>Creativity and social systems – what are most conducive (external) conditions for the development of creativity?</p>	<p>The research findings from several studies (Ekvall, 1996; Isaksen, 1995) suggested that, in a creative climate, the participants in the organization:</p> <ul style="list-style-type: none"> • Feel challenged by their goals, operations and tasks • Feel able to take initiative and to find relevant information • Feel able to interact with others • Feel that new ideas are met with support and encouragement • Feel able to put forward new ideas and views • Experience much debate within a prestige-free and open environment • Feel uncertainty is tolerated and thus risk-taking is encouraged

Source: own elaboration based on Craft (2001).

The research on the characteristics of creative people is especially interesting from the point of view of education. A good teacher is a foundation of every good school. Therefore, all methods for recruiting creative teachers for education should be valued and implemented in every country. It has to be stated, however, that the identification of traits does not translate from Professor Øyvind L. Martinsen of BI Norwegian Business School, who reveals that the number of traits is quite limited (as compared, for example, with the list showed in Table 1). To identify characteristics of creative individuals, Martinsen gathered a group of artists, musicians and marketing creatives, and compared them with a control group of managers and others in professions less associated with creativity. Martinsen found seven personality traits, which stood out among the artistically inclined:¹

¹ J. Stillman, *7 Characteristics of Highly Creative People*,

- Associative orientation: Imaginative, playful, have a wealth of ideas, ability to be committed, sliding transitions between fact and fiction.
- Need for originality: Resists rules and conventions. Have a rebellious attitude because of a need to do things no one else does.
- Motivation: Have a need to perform, goal oriented, innovative attitude, stamina to tackle difficult issues.
- Ambition: Have a need to be influential, attract attention and recognition.
- Flexibility: Have the ability to see different aspects of issues and come up with optimal solutions.
- Low emotional stability: Have a tendency to experience negative emotions, greater fluctuations in moods and emotional state, failing self-confidence.
- Low sociability: Have a tendency not to be very considerate, are obstinate and find faults and flaws in ideas and people.

How did the school change? – From IQ supremacy to creativity

The current model of education was introduced on a mass scale in Prussia in the early 19th century. German children were the first to attend compulsory education. It should not be surprising that in the second half of the 19th century, Prussia (which has now united all the German states except for Austria) became the first-class world-power, outpacing France and Britain in many aspects of socio-economic development. It should not be surprising that after the defeat by Germany in 1871, France initiated a series of reforms in its education and science systems to keep up and compete with its eastern neighbor. The industrialized countries of the West developed their education systems to serve the needs of fast growing industries, armies and bureaucratic organizations. Such a model of education based on espousing intelligence has proven to be efficient and successful. But the growth of a knowledge-based economy has posed a new set of questions about the fundamentals of the education system. The shift from *intelligence* towards *creativity* is one of the major discussion points in debates about the future of education. In England, there have been two recent periods in which creativity has been recognised as a desirable aim for inclusion in the curriculum, particularly in primary

education. The first was in the 1960s with the publication of the Plowden Report and the second was during the late 1990s. There has been a growing recognition from policy-makers and commentators alike that learner creativity is an extremely important aim for education (Draft 2001). Perkins (1999) argues that teachers need to adopt a pragmatic approach in enabling pupils to construct their own understanding of knowledge, which further enables them to express creativity.

More and more jobs require skilled workers who are able to learn faster and find new solutions to problems which did not exist in the past. On the other hand, the Internet is providing opportunities to process information, which, in many respects, does not require a high IQ from workers. Google Maps and GPS are examples of technologies which literally make 'spatial intelligence' dispensable. Humans who are intelligent can still benefit from their intellectual prowess, but low IQ is not as disadvantageous as it used to be in the past. What really matters is creative skill. For this reason, the question of recruiting creative teachers for education systems worldwide is of paramount importance.

Creative teachers

It is not enough to hire creative individuals for the education system. What counts is whether they will try to apply their innate or already developed creative skills to teaching in class. The development of creativity among teachers should be an ongoing process. Marisa Constantinides proposes the following eight-step process:²

1. Step one: become a knowledgeable teacher – this implies learning about other things. Creative teachers bring more to class than just a knowledge of teaching. They are educated in other areas, and can draw on their experiences and outside interests.
2. Step two: connect with other teachers – networking with other teachers and knowledge sharing are the sources of inspiration and growth.
3. Step three: become a collector of teaching ideas – this implies collecting and organizing ideas in a way that makes it easy to try them out when the right opportunity presents itself.

² M. Constantinides, *Eight steps to becoming a more creative teacher*, Creativity Now! February 2013, Vol. 70, no. 5, <https://www.britishcouncil.org/voices-magazine/eight-steps-becoming-more-creative-teacher>, [accessed on: 03.01.2016].

4. Step four: share your learning – it has been suggested that a teacher creates a medium of communication where she presents her ideas, e.g. through a teaching journal or a blog. Blogging and describing teaching ideas generates conversations with other teachers, and those conversations stimulate more ideas.
5. Step five: remove the blocks to creative thinking – these may include low self-esteem and/or a lack of social support from colleagues.
6. Step six: practise your creativity – when practising anything, teachers should take satisfaction in their daily tasks in the present moment rather than worrying about the results.
7. Step seven: start experimenting and reflecting on your teaching – students tend to respond positively to teachers who don't follow the same old steps in the same old way, day in and day out. As much as learners like teachers who are patient, tolerant and able to explain things well, they appreciate teachers whose lessons have surprises and elements of fun.
8. Step eight: make creativity a daily goal – being creative can help you solve problems. This is useful to teachers because problem-solving is what teachers do every moment of their working day, from deciding on teaching materials, procedures and grades, to adapting an activity that learners are not responding to, and helping individuals who are not progressing as they should.

Experienced teachers have a few well-worn techniques in their teacher toolboxes, but new teachers are expected to build the same levels of student interest with their quivers nearly empty. A study by Bramwell et. al. (2011) suggests that creative teachers do similar things. Creative teachers routinely customize their own learning activities and also glean and adapt techniques.³ Creativity in a teacher's profession, to some extent, defies logic, because it requires the abandonment of the curriculum and 'seeing the big picture' of the Word. Teachers are traditionally very attached to their subject topics and consider them as 'no-go' areas for other teachers. But each history lesson could be made more attractive to students if it included elements of physics (e.g. the history of breakthrough discoveries). Perhaps, one of the few subjects which allow for more freedom for the teacher is the lesson of a native language.

³ Ben Johnson, "Creative Teacher" Is Not an Oxymoron, <http://www.edutopia.org/blog/creative-teacher-not-oxymoron-ben-johnson>, [accessed on 16.01.2016].

An interesting insight into the role of creativity in achieving excellence among teachers is provided by the study which showed that 90% of award-winning teachers happen to be highly creative teachers. The study reveals that to be an effective teacher one must be a creative teacher. What lessons can be learned from award-winning creative teachers? Outstanding teachers share how they teach creatively in an age of scripted lessons and accountability.⁴ According to Daniel Pink (2005), creative thinking is increasingly necessary for accomplishing goals in our complex, interconnected world, and education researchers and psychologists emphasize the importance of these abilities. In their research, Danah Henriksen and Punya Mishra conducted interviews with eight highly successful teachers—each of whom was a finalist or winner of the National Teacher of the Year award from 2000 to 2010 (Henriksen, 2011)—“with an eye to their creative practices”. Looking across applications for the National Teacher of the Year award for the same stretch of years, we found that more than 90 percent of finalists and winners highlighted creativity as a key teaching theme and gave examples of creative teaching in their practices. In addition, research suggests that “effective” teaching is essentially the same as “creative” teaching (Davidovitch & Milgram, 2006). Danah Henriksen and Punya Mishra suggest the following teaching approaches, which are consistent with other findings presented in this paper:

- Connect your interests with your teaching.
- Link lessons to real-world learning.
- Cultivate a creative mindset.
- Value collaboration.
- Take intellectual risks.

Summary

The development of strategies which encourage creativity in education needs further investigation. Although the creativity of a teacher should not be an end in itself, more and more evidence shows that supporting creative teachers is synonymous with effective education. Such ascertainment is, if not radical, certainly unpopular in the current education system. The fact

⁴ Danah Henriksen and Punya Mishra, Learning from Creative Teachers, <http://www.ascd.org/publications/educational-leadership/feb13/vol70/num05/Learning-from-Creative-Teachers.aspx>, [accessed on: 03.01.2016].

that there are many creative teachers does not change the fact that educational structures and the mindsets of policymakers are still not fully prepared for the changes needed in the education system, where creativity should be not a 'add-on' or 'nice-to-have' feature, but should lie at the core of each teaching strategy and teacher development programmes.

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EFFECTS OF THE CONSTRUCTIVIST LEARNING ENVIRONMENT IN A MATERIAL DEVELOPMENT COURSE ON TEACHER CANDIDATES' CREATIVE THINKING SKILLS

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Abstract

The main purpose of this research is to determine the effects of the constructivist learning environment in a material development course on teacher candidates' creative thinking skills (CTS). In the present research, the single group experimental method was used. Furthermore, to explain the CTS of teacher candidates more clearly, qualitative report analysis was conducted on weekly reports of the teacher candidates. Thirty-six (n=36) teacher candidates, who were randomly divided into seven collaborative working groups (CWG) consisting of five or six members, participated in the study. According to the quantitative result, it was determined that the constructivist learning environment used in the material development course is highly effective in the CTS of the participants. Moreover, the results of the qualitative analysis conducted on weekly reports revealed that such constructs are open to criticism, new ideas, collaboration, taking responsibility, self-regulation, flexible thinking, a focus on one's purposes, and the effort of reaching excellence. However, constructs such as doing just enough, uncreative thinking, not being open to criticism, low learning motivation and aversion to collaboration are determined as obstructive constructs for the CTS of the teacher candidates. Within this context, both quantitative and qualitative findings were discussed with regard to the CTS of the teachers, the importance of material development for effective learning and the constructivist learning environment.

Keywords: constructivism; material development; creative thinking skills; teacher candidate.

1. Constructivism and its Effect on Curricula and Instruction

For almost two decades, “learning by doing” has been the magic concept in the educational context and is still being debated by scientists, philosophers and psychologists in order to find better learning approaches and the characteristics of learning process. In this context, the latest approach, named as constructivism, which has been acknowledged as both a “paradigm” and a “theory” (Fosnot, 1996), explains that learners should be at the center of the learning process actively. According to the constructivist approach, there is no independent knowledge without meaning being actively attributed to tentative objects by learners or groups of learners (Boghossian, 2006; Wilson Brent, 1997). There are different types of constructivism such as radical, cognitive, and social, etc. However, even though they have different perspectives in terms of knowledge building processes, the idea known as “learners construct their own knowledge actively” is at their core. Mainly, constructivist theory is revealed from the ideas of Vygotsky, Piaget, Dewey and von Glasersfeld. Furthermore, Piaget states that the knowledge building process should be directed from the individual to the social (Stears, 2009), and for Vygotsky, conversely, it is from the social to the individual (Vygotsky, 2012). According to Boghossian (2006), in a simple perception, learners construct or find essence in the meaning of the learning subject, and thus their meanings become knowledge. However, meaning which is constructed by a learner may not be knowledge for another learner because of a lack of objective criteria in order to form knowledge (Poerksen, 2004).

On the other hand, from an educational view, constructivism has been of vital importance on curricula and instructional processes, with the major implications of: (a) learning being an active process; (b) knowledge being constructed by the learner and definitely not imposed by teachers; (c) knowledge being constructed by learners in a social environment; (d) learners’ prior knowledge being the primary learning source in the learning process; (e) learning being the process of making sense of information (Fox, 2001); and (f) knowledge being constructed by learners’ experiences. According to these implications, curricula and instructional processes have been modified over the last two decades, especially in the fields of teacher training curricula in higher education (Hendry, Frommer & Walker, 1999; Jones, Lake & Dagli, 2005; Schweitzer & Stephenson, 2008) and in national education (de Kock, Slegers & Voeten, 2005;

MEB, 2004¹; Roelofs & Terwel, 1999) systems. In this context, the roles of the teachers in instructional processes have naturally been affected.

2. New Roles of Teachers

All teachers should design their roles in the classrooms and should make arrangements such as instructional plans, learning goals, and vivid texts and materials used in classrooms to provide effective learning environments to students according to the curriculum (Brown, 2009; Remillard, 2005; Rotgans & Schmidt, 2011; Tynjälä, 1999). Moreover, new curricular reform based on the constructivist approach brings important responsibilities to teachers. In this context, teacher candidates' professional development is critically important with regard to their in-class practices, which is a shift from a knowledge-transmission model to a knowledge-building model (de Kock et al., 2005; Schelfhout et al., 2006). Furthermore, teacher candidates have to master the content knowledge which is necessary to help the learners; also, they need to have skills related to teaching-learning strategies and techniques as well as effective instructional design. In addition to these characteristics of teachers, collaborative working (Chang, Yeh, Chen, & Hsiao, 2011; Gregory, 2010; Rigelman & Ruben, 2012; Hornby, 2009; Ruys, Van Keer & Aelterman, 2011), communication (Campbell et al., 2000; Hunt, Simonds & Cooper, 2002; Postholm, 2012) and organizing active-practical experiments (Borko, 2004; Chang et al., 2011; Pierson & Borthwick, 2010) as well as problem solving skills (Erdamar & Alpan, 2013; Garcia, 2011) are important for both social and cognitive constructivism and their professional development. Moreover, promoting CTS of teachers (Barnes & Shirley, 2007; Likar, Cankar & Zupan, 2014) and students (Garcia, 2011) is one of the most important aims in curricula and instructional environments (Reilly, Lilly, Bramwell & Kronish, 2011) being part of higher-order thinking skills.

According to Likar et al. (2014), education systems, objectives and instructional approaches should be structured to support students' CTS. In a recent review conducted by Reilly et al. (2011, p. 534), the characteristics of creative teachers are explained as follows. Teachers:

- Are *innovative* (extending the boundaries of the conventional through new combinations, either planned or serendipitous).

¹ The Ministry of Education (MEB) has started (2004) to use new curricula based on the constructivist approach in the national education system in Turkey.

- Have *ownership* of the knowledge (changing or modifying the curriculum to address the specific needs of students and/or the educational goal).
- Exercise *control* over the teaching processes involved (having a need for choices and the power to make them through practical involvement).
- *Operate within a broad range of accepted social values while being attuned to student cultures.*
- Are *independent* (have minds of their own, but are strongly collaborative).
- Have a *humanist approach* (focus on the student as a developing person).
- Are guided by a *strong moral purpose* (clear values).
- Demonstrate *a concern for equity.*
- Are *teacher- as well as student-centered* (they create an atmosphere to ensure learning and engagement).
- Use *firm control* (tinctured with care).
- Exhibit *a strong emotional investment in teaching* (they are passionate about their work).

In the context of these characteristics, it can be seen that a constructivist approach has a compatible structure with creative teaching/learning environments.

As stated by Leaman and Flanagan (2013) and Barnes and Shirley (2007), we must be aware of the fact that instructional knowledge and application are shifting from the base of lower-order thinking to higher-order thinking day by day. Moreover, to reach the targets imposed by the current era, the needs of creative and innovative teachers should not be ignored, and creative instructional approaches should be used in the initial teacher education programs (Grainger, Barnes & Scoffham, 2004). Craft (1997) describes “creativity in teaching as being ‘inventive flexibility’ because no two groups of learners are identical, and because no two days are the same”, and teachers are de-facto curriculum designers (Boote, 2006). In this context, studies which support enhancing the CTS (higher-order thinking) of teachers are very limited in the Turkish Education System (Oral, 2006).

3. Research Problems

In the present research, the following research questions were investigated:

- *Research Question 1:* Is there any significant difference between the pre- and post-CTS scores of the teacher candidates working in a constructivist learning environment in a material development course?
- *Research Question 2:* What are the key constructs affecting the CTS of teacher candidates?

4. Method

The study was implemented in the spring semester of 2014 during the “Material Development Course” which takes place in the curriculum of the department of primary school teaching. In the study, a single group experimental method was used. Thirty-six (n=36) second grade teacher candidates who were randomly divided into seven collaborative working groups (CWGs) consisting of five or six members, participated in the study. Descriptive statistics of the teacher candidates in each CWG are shown in Table 1.

Table 1. Descriptive statistics of teacher candidates’ genders and age in each CWG group

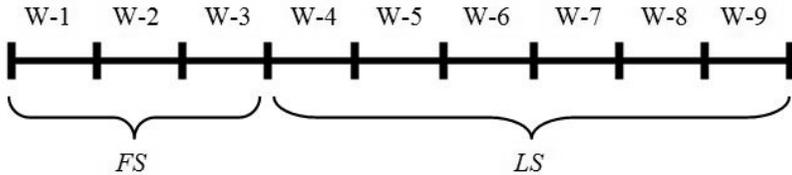
CWG	Genders (Male: M / Female: F)				Total (n)	Mean Age
	M		N			
	n	(%) f	n	(%) f		
CWG-1	3	50	3	50	6	19.33
CWG-2	1	20	4	80	5	18.4
CWG-3	2	40	3	60	5	18.6
CWG-4	1	20	4	80	5	19.8
CWG-5	2	40	3	60	5	19.4
CWG-6	1	20	4	80	5	20.2
CWG-7	2	40	3	60	5	19.00
Total	12	33.3	24	66.6	36	19.24

Moreover, the “How creative are you?” scale (HowCaY) was applied pre- and post-test to the teacher candidates. At the end of the study, qualitative analysis was conducted on weekly reports of the teacher candidates.

4.1 Research procedure

The study was completed in the 9-week period, as each week, teacher candidates took the courses for four hours (see Figure 1).

Figure 1. *Research process (9 weeks)*



In the first three-week period (first-stage [*FS*]), course teachers both presented and discussed the aims, basic principles and primary course subjects with the teacher candidates in the context of the material development course. The aim of the *FS* was to provide the teacher candidates with the opportunity to instill the basic constructs of the course subjects into their minds; in that, according to the constructivist approach, meaning is constructed on the learners' prior learning constructs. After the *FS* of the study, teacher candidates selected a subject in which they would collaboratively prepare a material development plan and develop material to use in the learning process for the subject.

On the other hand, during the last six-week period (last-stage [*LS*]), each week, during the 20-minute period, each CWG presented their weekly plan of the material that they would develop to the other CWGs in the classroom, and presented a report, which clarified what they would plan for their material in the current week, to the course teacher. Moreover, they noted the comments from the members of other CWGs. Additionally, the course teacher assessed the weekly reports of the CWGs and sent a feedback form to the CWGs via e-mail. At the end of the study, weekly reports of each CWG were analyzed using the inductive content analysis method.

4.2 The “How creative are you?” scale (HowCaY)

In the present study, the “How creative are you?” scale (HowCaY) was used both pre- and post-test to determine the creative thinking skills (CTS) of teacher candidates. The original HowCaY was developed by Whetten and Cameron (2002) and has 40 items. The first 39 items include a 3-point Likert scale “*Agree, Undecided or Don't know, Disagree*”. The last item

involves choosing ten words from a word list which has 54 independent words (Whetten & Cameron, 2011). The scale was adapted into Turkish by Aksoy (2004). The Turkish form of the HowCaY scale has a similar structure to the original scale, in that there are 39 items that include a 3-point Likert scale and one item where ten words are chosen from a word list which has 54 independent words. The online form of the scale can be reached via link (HTTP, 2014). Moreover, the Cronbach Alpha score of the HowCaY scale was determined as 0.94 by Aksoy (2004). Also, HowCaY scores of teacher candidates were assessed as “95-116 Exceptionally creative”, “65-94 Very creative”, “40-64 Above average”, “20-39 Average”, “10-19 Below average” and “Below 10 Noncreative”. In the current study, the Cronbach Alpha score of the HowCaY scale was determined as .88.

4.3 Inductive content analysis of weekly reports

Inductive content analysis of weekly reports was practiced by two independent experts. One of the experts is the author of this paper, who has a Ph.D. degree from the educational sciences curriculum development department. The other is a Ph.D. candidate in the same department. In the analytical process, the steps given below were followed:

- Weekly reports from the groups were saved as two copies.
- Each expert analyzed one copy independently.
- In the analysis process, the experts determined the codes in terms of creative thinking.
- The experts discussed the codes together.
- The code(s) on which the experts have no consensus (if either of the experts did not accept that the code(s) could be extracted from the text, or if they were not convinced) were removed from the analysis.
- The experts created the themes as constructs together.

Moreover, to determine the reliability score of the content analysis conducted on weekly reports, Miles and Huberman’s technique was used. According to the result of the analysis, it was determined that expert agreement reliability was .79.

5. Findings

5.1 Research Question 1

For Research Question 1, paired sample t-test analysis was conducted on the pre- and post-HowCaY scores of the teacher candidates. The results are shown in Table 2.

Table 2. T-test results of pre- and post-HowCaY scores of the teacher candidates

HowCaY Scores	N	\bar{X}	Std. Dev.	t	df	Sig. (p)
Pre-HowCaY	36	25.56	6.95	-13.010	35	.000 ^a
Post-HowCaY	36	55.90	11.47			

According to Table 2, it was determined that there is a significant difference between the pre- and post-HowCaY scores of the teacher candidates [$t_{(35)} = -13.010, p = .000$].

5.2 Research Question 2

In the process of inductive content analysis, nine themes were determined as constructs, which support the CTS of teacher candidates. These constructs are named as “*being open to criticism*”, “*focusing on purposes*”, “*collaboration*”, “*being open to new ideas*”, “*the effort of reaching excellence*”, “*taking responsibility*”, “*self-regulation*”, “*flexible thinking*”, “*literature reviewing*” and “*recognition of teachers’ instructional efforts*”. However, such constructs as “*doing just enough*”, “*uncreative thinking*”, “*not being open to criticism*”, “*low learning motivation*” and “*aversion to collaboration*” are determined as obstructive constructs for the CTS of the teacher candidates. Moreover, detailed information about the constructs is shown in Table 3.

Table 3. Results of inductive content analysis conducted on weekly reports

Explanation	Constructs (Themes)	Code(s)	f
Supportive CTS	<i>being open to criticism</i>	Editing	27
		Make corrections	24
		Appreciation of ideas	20
		Considering feedback	19
		Find a decision justified	14
	<i>focusing on purposes</i>	Revision of purposes	25
		Fixing the purposes	20
	<i>collaboration</i>	Helping each other	23
		Dispute settlement	18
		Considering the ideas of group members	18
		Team work	17
	<i>being open to new ideas</i>	Using a different viewpoint	28
		Developing more effective material	25
	<i>the effort of reaching excellence</i>	Determining inadequacies	16
		Repairing inadequacies in the material	13
	<i>taking responsibility</i>	Participating	26
		Embracing	17
<i>self-regulation</i>	Changing designs	12	
	Arranging designs	8	
	Accepting deficiencies	8	

Supportive CTS	<i>flexible thinking</i>	Using materials for different aims	16
	<i>literature reviewing</i>	Reaching new resources	15
	<i>recognition of teachers' instructional efforts</i>		19
Obstructive CTS	<i>doing just enough</i>	Finding enough	21
	<i>uncreative thinking</i>	Ignoring different viewpoints	15
		Narrow points of view	7
	<i>not being open to criticism</i>	No imagination	5
		Challenging new ideas	9
		Rejecting criticism	8
		No belief in ability to achieve	11
	<i>low learning motivation</i>	Fear of failure	7
Conflicts		14	
<i>aversion to collaboration</i>	Tendency to self-study	6	

According to Table 3, there were 32 codes extracted from the weekly reports of the students. While 22 of them are related to supportive constructs of the CTS of teacher candidates, 10 of them are related to obstructive constructs of the CTS of the teacher candidates. Moreover, pictures of some materials developed by the CWGs are given in Figure 1 and 2.

Figure 2. *Five sense organs of humans (Developed by CWG-4)*

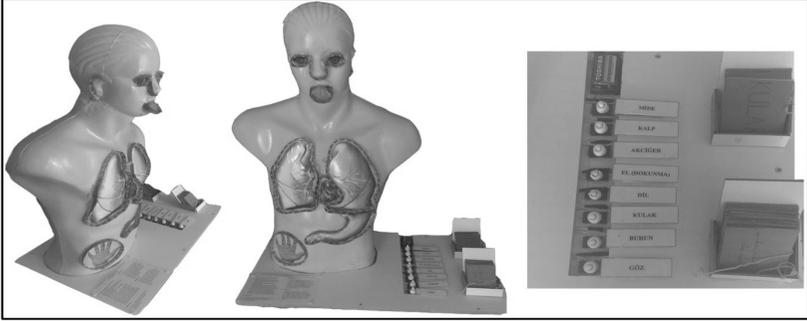


Figure 3. *The Cultural and Spatial characteristics of Cities and Regions of Turkey (Developed by CWG-1)*



6. Discussion and Conclusion

According to the results of the quantitative analysis, it was determined that there is a strong supportive effect of the constructivist learning approach used in the material development course on the CTS of teacher candidates. While the level of teacher candidates' CTS was at an "Average" level at the beginning of the study, at the end of the study they reached an "Above Average" level. Furthermore, when focusing on the basic qualitative findings, the reasons why the approach has a strong effect on the CTS of teacher candidates can be explained, in that the constructivist approach enables a learning environment in which learners can make decisions independently, arrange their plans, and work collaboratively. It serves as a flexible environment and learners can also

use previous knowledge apart from the knowledge presented to them by a course teacher. In addition to these points, they can help each other to reach the main goal in terms of exchanging different ideas with collaborative group members. On the other hand, the material development course is a very suitable structure to enhance the CTS of teacher candidates in that it gives learners the chance to apply their plans or ideas to a material, so they can determine whether their plans or ideas are really suitable and usable on the material. In this context, constructs named as “*being open to new ideas*”, “*the effort of reaching excellence*”, “*self-regulation*”, “*recognition of teachers’ instructional efforts*”, “*taking responsibility*” and “*flexible thinking*” are very clear evidence.

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