International Journal of Instruction *January 2017 ● Vol.10, No.1*
e-ISSN: 1308-1470 ● www.e-iji.net *p-ISSN: 1694-609X*
pp. 151-168

Received: 05/04/2016
Revision: 03/07/2016
Accepted: 09/07/2016

Teaching Argumentation by Using Facebook Groups

İbrahim Delen
Asst. Prof., Usak University, Usak, Turkey, *ibrahim.delen@usak.edu.tr*

Today argumentation is widely emphasized in the policy documents in Europe, and the US. Once we look at the literature in the last two decades, many studies noted students' challenges in this process. On the other side of the coin, we see in-service teachers with problems to support this process. Unfortunately, very few studies focused on this issue by studying pre-service teachers. By using Facebook groups as a discussion tool, this study focuses on supporting pre-service teachers when engaging in argumentation. Before starting the course none of pre-service teachers (N=58) could design an activity that includes justifying the evidence (reasoning). During the course, 12 groups made presentations and other groups critiqued these presentations. Once the instructor publicly started making comments in the Facebook page to discuss which groups are performing better, the level of critique in student responses started including more details about argumentation. This positive change supported almost all students in designing activities that focus on using evidence and connecting to reasoning at the end of the course.

Key Words: teacher education, social networks, argumentation, online discussions, instructor's role, activity design

INTRODUCTION

More than five decades ago Toulmin (1958) developed a model for argumentation. Today this idea is widely emphasized in the policy documents in Europe (Osborne & Dillon, 2008), and the US (Achieve, 2013). On the other hand, Turkish national science curriculum had major updates in the last decade, and one of the important additions made is the emphasis on argumentation (MEB, 2013). Despite the efforts to engage with modern educational approaches by making the teacher facilitator of classroom activities (Koc et al., 2007), the previous curriculum put an emphasis on an old approach, science process skills, when engaging students with creating arguments (Delen & Kesercioglu, 2012). Although science process skills are still prominent in the new curriculum, there is a shift to argumentation (MEB, 2013) and the pre-service teachers need support to understand that approach.

To address this need, this study was designed around a course that supported online discussions when learning to design activities to support argumentation in elementary

teacher education program. In Turkish context, teaching science starts at 4th grade, and elementary teachers teach this course for a year. Middle school starts in 5th grade and students start having separate teachers for each discipline. Since Turkish elementary teachers expected to teach a variety of topics all together (e.g. Math, social sciences, science), this study takes a broader lens and focuses on engaging in topics outside science education when focusing argumentation (Osborne et al., 2004; Simon et al., 2006). The process of argumentation includes forming opinions, it can be linked to creating arguments in everyday life. But in this study argumentation model focuses on following the scientific model (McNeill & Krajcik, 2008): (1) students create claims, (2) students add their evidence, and (3) they include their reasoning to discuss how the evidence can help explain their claims.

The course offered in this study is taken by undergraduate seniors in the last Spring term, and focuses on understanding to implement argumentation when using different educational methods and techniques in elementary education. In the first six weeks of the course, the author taught the history of educational theories briefly, and created several activities to engage students in argumentation. Then, 12 student groups were formed, and these groups were asked to implement argumentation in one of the educational theories. Each group prepared a 45-50 minute presentation, and groups discussed how this presentation supported the selected theory and argumentation in a Facebook group. More details about the course will be presented in methods chapter. Before moving forward, the following section will discuss what has been done to support teachers with an emphasis on argumentation.

Teachers & Argumentation

Osborne and colleagues (2004) studied twelve teachers that implemented an activity discussing the affordances and limitations of zoos in two consecutive years, and focused on developing tools to analyze classroom practices in relation to argumentation. The researchers found that there was an improvement in teachers' practices in the second year, and the changes varied across teachers. Although, teachers struggled to support higher-level arguments (e.g. providing rebuttals), Osborne and colleagues (2004) noted that teachers can adopt argumentation into their classroom practices. In another study, McNeill and Krajcik (2008) studied thirteen middle school teachers as they engaged students in constructing arguments while implementing the same unit, in order to investigate how using various instructional strategies supports students in constructing scientific arguments.

The studies presented above noted that various instructional supports have the potential to enhance teachers' construction of arguments. These studies also added that it is challenging for teachers to support students in constructing arguments (Osborne et al., 2004; McNeill & Krajcik, 2008). Exploring the literature that focuses on preparing these teachers when they are pre-service teachers, we see few examples.

One of the studies in this era described pre-service teachers' practices. Zembal-Saul (2009) investigated pre-service teachers' implementations in relation to scientific arguments. Forty-one pre-service teachers participated in the study, and implemented

the same unit focusing on air. The majority of the pre-service teachers (22 of them) focused on designing investigations instead of engaging students' with scientific arguments. Of these forty-one participants, only three pre-service teachers focused on building arguments by discussing the evidence (Zembal-Saul, 2009).

Crawford and colleagues (2005) used Galapagos Finches project in *Explanation Constructor* software (Sandoval & Reiser, 2004) with pre-service teachers from different disciplines. Authors found that pre-service teachers struggled to use evidence for creating scientific arguments and mainly biology pre-service teachers noted that they could use the software in their teaching (Crawford et al., 2005).

We can clearly note here that not only in-service teachers, but also pre-service teachers struggle when engaging in argumentation. Unfortunately we have very few studies focusing on supporting pre-service teachers. In conjunction with this we need, the examples in Turkish context are scarce. To address this gap, the goal of this study is to support pre-service teachers with participating in online discussions.

Why using online discussions?

In the last two decades, the use of computers in education provided new prospects for education and many scholars have used computers to support student discussions. In one of the early studies, Jeong (1996) studied online chats in University of Wisconsin with students taking a graduate class. Jeong (1996) summarized the main advantage as enabling students to contribute interactively in various conversations at the same time. On the other hand, Jeong (1996) also noted miscommunication, and students' inability to followsynchronous discussions as the challenges.

Koh and colleagues (2010) studied the nature of asynchronous discussions happening in a graduate level course designed with an emphasis on project-based learning. After analyzing the messages posted by the instructor, and the students participating in the course, authors found high level messages happened fewer than their expectations. To change this trajectory, Koh and colleagues (2010) suggested instructors analyzing student discussions to assist students to move to higher levels of discussions.

In a later study, Jeong and Lee (2008) focused on understanding how having reflective and active learners can change the nature of the online debates. Authors focused on examining the quality of the arguments created in three different discussions, and concluded that having reflective learners in the group is essential for increasing the quality of the arguments created in the online discussions.

In a more recent study, Lin and colleagues (2013) focused on examining the online discussions happening in social networks. In this study, authors worked with 62 college students, and asked students to get involved in discussions focusing on the ideology of several artists. Using social networks provided an interactive discussion, but the level of discussions rarely showed high-level cognitive understanding (Lin et al., 2013).

In the last two decades many studies used online groups in education, and scholars also started to examine to role of social networks in education (Mazman & Usluel, 2010; Lin

et al., 2013). Similar to Lin and colleagues' focus on online discussions (2013), this study aims to use Facebook as a means to support pre-service teachers to improve their practice of argumentation. The research questions examined in this process were:

- How did pre-service teachers use argumentation when designing activities before the course?
- How did using Facebook groups help pre-service teachers' understanding of argumentation?
- How did pre-service teachers use argumentation in the activities they created during the course?

How the course works?

In this study, seniors studying elementary teacher education (58 students; 11 males, 47 females) in a Turkish public university took a course designed to teach using argumentation in different activities. When addressing argumentation for teacher candidates, this study focused on including activities aligned with the educational theories/ techniques used in Turkey. These theories/ techniques include: multiple intelligences, constructivism, problem based learning, project based learning, using scenarios and stories, and collaborative learning. All these theories/ techniques can be linked to constructivism, which is the underlying philosophy of the Turkish curriculum.

Table 1
Course Plan

Weeks	*Topics*
1-2-3	Pre-test. History of Educational Theories
4-5-6	Theories/ techniques in Turkish curriculum & Argumentation activities
7	Group 1- Constructivism
8	Group 2- Multiple Intelligences. Group 11- Multiple Intelligences
9	Group 3- Problem based learning
10	Group 4- Collaborative learning
11	Group 5- Project based learning. Assignment 1 due date
12	Group 6- Problem based learning
13	Group 7- Project based learning
14	Group 8- Using scenarios in education
15	Group 9- Using stories in education
16	Group 10 & 12- Constructivism. Assignment 2 due date

After distributing educational theories/ techniques, each group (Initially 10 groups were created but four students decided to have separate groups, which created two additional groups: Group 11 and Group 12. These groups presented in two classes that had an additional session.) was asked to prepare a 45-50 minute lesson to implement these theories/ techniques. In addition to using these theories/ techniques, each group's task was to include activities that engage in argumentation. After each presentation, remaining groups provided comments (by adding their group numbers to their comment- see Figure 1) that contributed to a discussion about how the presenting group supported argumentation and the theory/technique assigned to them in the Facebook group. At the

end of each class, the comments and how the group performed were evaluated in whole group discussions.

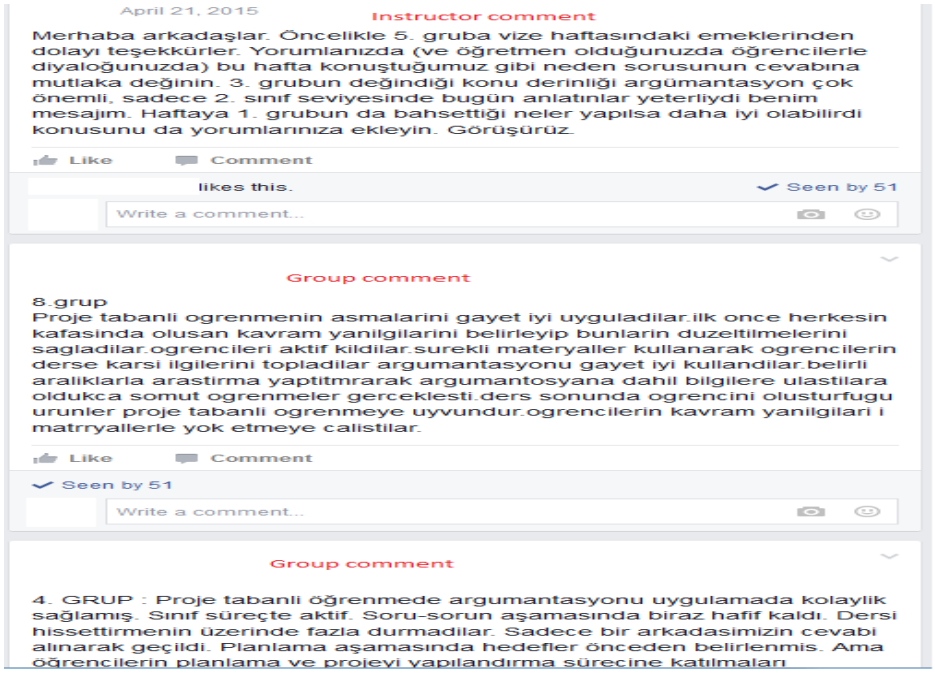

Figure 1
Group & instructor comments in Facebook group

METHOD

There were two main types of data sources in the study: (1) Students' activity design with an emphasis on argumentation, (2) Students' evaluation of argumentation activities in the online group. The main activity during the course focused on evaluating group performances with an emphasis on argumentation. As noted by De Wever, Schellens, Valcke, and Van Keer (2006), the "standards are not yet established" (p. 6) for analyzing student discussions in online environments. Because of that, the analysis process focused on the nature of the activity (Crawford et al., 2005; Zembal-Saul, 2009).

Three other sources of data were collected to understand students' understanding of argumentation. These data sources focused on examining what students knew about argumentation before the course and how their activities improved during the course: (1) Pre-test that asked students what they know about argumentation, and how they can use it in an activity. (2) Assignment 1 focused on creating an activity and embedding argumentation in the activity. This was similar to the group presentation, but done individually in addition to the presentation. (3) Assignment 2 focused on creating

scenarios that discuss how pre-service teachers would support students missing evidence and struggling with reasoning (McNeill & Knight, 2013). As presented below, the rubric was created by following McNeill and Knight's study (2013), and included two additional steps since pre-test was measuring how students defined argumentation. Table 2 presents the summary of the analysis for the pre-test, assignment 1 and assignment 2:

- (Level 0*): No knowledge of argumentation.
- (Level 1*): Only defines argumentation. Cannot make use of evidence.
- (Level 2): Student discusses the role of evidence without including specific evidence.
- (Level 3): Student includes specific evidence without making connections to reasoning.
- (Level 4): Student includes evidence with connecting to reasoning.

*Steps added to the McNeill and Knight's (2013) rubric for analysing pre-test

Besides investigating student activities, another data source focused on understanding how students evaluated each other during the course. Zembal-Saul (2009) characterized the activities designed by students in four groups: Activity based, investigation based, evidence based, argument based. Since the students were analysing activities designed by other students when making comments in the group page, Zembal-Saul's criteria (2009) were adopted in this process. Activity based and investigation based are merged into one category, Level 1. Evidence based is redefined as 'basics of argumentation' under Level 2. Finally argument based became Level 3:

- Level 0: No information.
- Level 1- Activity based: Group only focused on theory/ technique. No emphasis on evaluating argumentation.
- Level 2- Basics of Argumentation: Group focused on theory/ technique and also briefly evaluated argumentation activity without adding details (e.g. how they used evidence, how they connected in reasoning).
- Level 3- Argument based: Group discussed theory/ technique and added (evaluative) details about argumentation activity.

After designing the codes, a graduate student and the author coded all the data. For each data source (pre-test, assignment 1, assignment 2, and the group comments), we first coded 20% of the data. For pre-test, assignment 1 and assignment 2 each coder focused on coding 12 randomly selected examples. When coding group comments, each coder analysed two groups' randomly selected entire comments. In this process, the inter-rater reliability score was higher than 90% when coding all data sources. If there was a disagreement between coders, these differences were solved in discussion meetings. Finally coders shared the rest of the data for completing the analysis.

The codes listed above first categorized the data, and then they were used to "uncover the relationships among categories" (Strauss & Corbin, 1998, p. 127). In this step, categories under each data source were compared to find out students' performance before and after the course (see Table 2 and Table 3).

FINDINGS

When discussing the findings, this section will first present the student performance during the course by looking at how students focused on aspects of the argumentation in the pre-test, assignment 1, and assignment 2 (what students knew about argumentation before the course and how their activities improved during the course). Finally, this section will discuss how using Facebook groups was instrumental in supporting this process.

Table 2
Students' Argumentation Performance

	No Knowledge	*Definition*	*Use of Evidence*	*Specific Evidence*	*Reasoning*	*N*
Pre-Test	17 (30%)	23 (42%)	7 (13%)	8 (15%)	---	55
First Assignment	NA	NA	---	7 (12%)	51 (88%)	58
Second Assignment	NA	NA	----	1 (2%)	57 (98%)	58

How did pre-service teachers use argumentation when designing activities before the course?

Pre- Test Findings

When students were asked to define what they know about argumentation and how they can use it in an activity in the first week of the course, three students were absent and did not participate. Of the remaining 55 students, none mentioned reasoning. 17 of these students did not present any understanding of argumentation. For instance one of them noted: "It is related to creating activities … and it is linked to constructivism that suggest students build their own understanding". This student probably heard about argumentation, but does not have a clear idea in his mind.

Although almost 1/3 of the students did not have any idea of argumentation, 42% of them presented a definition without adding how they can use argumentation as justifying students' understanding. One of them described it as: "Using scientific evidence to explain phenomena. Proving an idea".

When discussing argumentation in an activity some students (15 out of 55) mentioned using evidence. Of these 15, seven discussed making use of the evidence briefly. One student described a sample activity as "I can use argumentation during experiments/ investigations. I would give a topic to students, and ask them to make research & presentations on these topics. By using this way, students would present the information by using evidence. This would teach science process skills".

The remaining eight students discussed specific evidence in their activities, but could not take this further to add reasoning. One of them focused on buoyancy: "When teaching buoyancy I would make an experiment by putting different materials in water.

This would help students to observe an abstract phenomena". Here the student is moving one step further, but does not discuss how this experiment can teach density.

How did pre-service teachers use argumentation in the activities they created during the course?

Assignment 1 Findings

As presented in Table 1, a majority included reasoning (88%) in the learning environments they created. One of these students focused on understanding what can be done during an earthquake. She started the activities by asking students whether they experienced an earthquake or not. Later she asked students what could be done to prevent incidents during earthquakes and supported her students creating their hypothesis. In the following activity, she asked students to collect evidence about earthquakes and finally helped students to discuss their evidence by making connections with their initial hypothesis. She also created earthquake scenarios to help students when discussing their evidence. Another student under this category created activities for teaching students how to fight with germs by focusing on where germs live and what are different forms (e.g. viruses, bacteria, fungi). When engaging students in argumentation she asked students to discuss what would happen if scientists did not discover the existence of germs. In this process, she helped students understand harmful (e.g. viruses creating diseases) and useful germs (e.g. bacteria to produce yogurt, bacteria in our digestive system) under the reasoning section.

Few students focused on only using specific evidence (12%) in assignment 1. One of these students created activities to teach how presence of light influences the heat differences during the day or night. In one of the activities she made students think why they wear jackets at night. However, she never connected these ideas with reasoning. She said she would engage students with reasoning but did not clearly discuss what she expected as reasoning.

Assignment 2 Findings

The nature of the assignment asked students to discuss the importance of including specific evidence and reasoning in their future classrooms. In this task, all but one of the pre-service teachers discussed how they can support reasoning. The only one missing the reasoning focused on activity design without making connections to argumentation.

One of the pre-service teachers focused on examining global warming in her scenarios. She started the assignment by adding the argument she was expecting to see at the end of the class: "There is global warming threating the natural life (claim). In our country, the days that the seasons usually start are changing. In the documentary we watched we saw icebergs are melting in North Pole (evidence). Using up the natural resources quickly and the increase in carbon dioxide and methane lead to the greenhouse effect that would increase the global heat (reasoning)". When discussing how to help her students when they are missing evidence, she designed an experiment for the student that included a candle and a teapot. She asked students to think of the lid as the atmosphere and the candle as a source that produces greenhouse gases (e.g. gases

coming from industrial areas). She placed the candle into the teapot, and asked student to observe how the smoke stayed inside the teapot. In the second part of the experiment, she placed the teapot on a heater and added water. As the water was boiling, she helped students to observe how the water became darker.

In this assignment, the pre-service teacher focused on reasoning by using an informative documentary before students created their arguments. Then she created another experiment by putting water into two pots, and placing them equal distance from a lamp. She measured the temperatures in these pots, and then placed another big cup upside down on one of the pots to represent the greenhouse effect. After waiting for 15 minutes, she asked students to measure the temperature, and discussed how the extra pot created the heat difference. After examining the greenhouse effect, students created arguments to discuss what they can do to create less harm for the environment.

How did using Facebook groups help pre-service teachers' understanding of argumentation?

Each student submitted two assignments, and they judged the quality of argumentation in weekly presentations (see Figure 1). In the presentation, the task was to engage in argumentation when creating activities with an emphasis on different educational methods and techniques. Figure 2 presents a sample activity in which students asked other students how to separate substances from each other. This activity asks participants to make initial claims about how to use magnets in this process (defined as Tahmin Et in the activity), then students collect data (defined as Gözlem in the activity), and finally they explain the evidence under the reasoning part (defined as Açıkla in the activity).

As presented in Table 3, in the first three weeks only one group judged the quality of argumentation. In these three weeks, the author only discussed how the presenters performed in the class, and reminded all groups how to judge the quality of argumentation. In the fourth week, the author started making public comments on the group page:

- Instructor comment before week 10 (C-4): "Hello everyone. As we discussed in class last week, we still have the same issue in your comments. There are no problems with evaluating the method, but 'argumentation was in the presentation' or 'they did not really implement argumentation' won't receive any credit in next week's comments. As your friends in Group 5 did last week, you need to specifically address how your friends implemented argumentation. Please also remember to turn assignment 1."
- Instructor comment before week 11 (C-5): "Your comments are getting better. Except for two groups (Group 3 and 6 did not focus argumentation), all others received credit about evaluating argumentation. You need to continue to be specific in your comments."
- Instructor comment before week 12 (C-6): "In your comments (and in your discussions with your students once you become teachers) continue to critique the reasoning part. As discussed by the 3rd group, the depth of content is crucial for

reasoning. However, the group today presented the content for second graders, and the level presented would be enough for that grade level. As 1st group noted, start adding what could be done to implement argumentation more efficiently. See you next week."

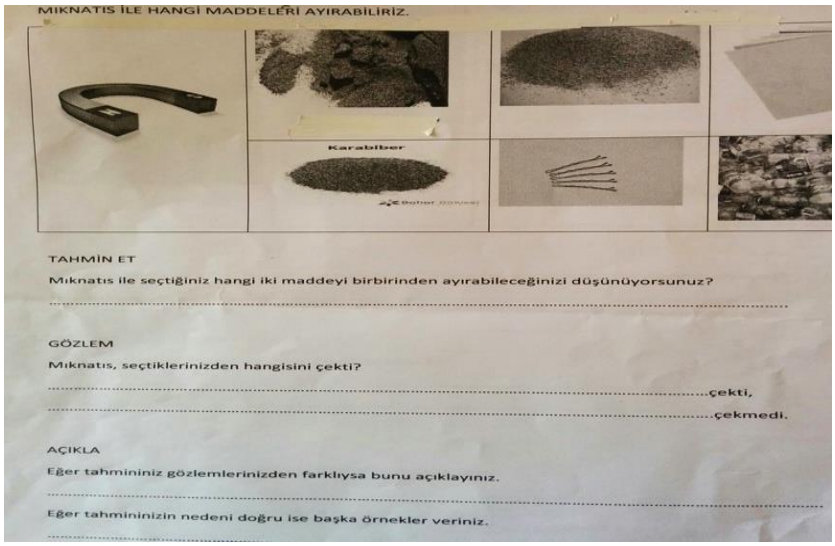

Figure 2
Sample Argumentation Activity

Before the instructor comments in the group page, only two groups discussed the specifics about argumentation. These groups focused on how the presenting groups used evidence and connected it with reasoning. Although, the author discussed how their comments could get better in whole class discussions, this did not have a huge impact until week 10. After the instructor intervention in the Facebook group, the quality of the comments increased for all groups, and almost all groups discussed specifics about argumentation. The first example (Group 5) that was publicly brought to students' attention evaluated by discussing the activity in week 10: "They used argumentation during the candle experiment by focusing on the results and why it happened". In the following week (week 11), the same group (Group 5) evaluated the activity with discussing evidence and reasoning: "They presented argumentation nicely since they always pushed students to discuss reasoning. They always asked students the source of evidence."

After the instructor intervention, Group 5 followed a perfect path. But, when presenting in week 11, they were criticized by other groups with their topic selection. Group 1 discussed this as:

"They organized the class with an emphasis on project-based learning and questioned students to present examples from their lives. When working in small groups, argumentation could be added to the process. For instance, when creating models, groups could explain what they did, and why they created such a model. In general the

presentation was good, but they could select a better topic that would align with using argumentation. As an example, students could discuss how they could solve the problems in the society."

Table 3
Groups' Performance in Facebook Groups

	C-1	C-2*	C-11*	C-3	C-4***	C-5***	C-6***	C-7***	C-8	C-9	C-10**	C-12**
Group 1	NA	2	1	1	3	3	3	3	3	3	3	3
Group 2	2	NA	2	2	3	3	3	3	3	3	--	--
Group 3	2	1	1	NA	1	3	3	2	2	2	2	2
Group 4	1	1	2	2	NA	3	3	3	2	3	3	--
Group 5	1	2	1	3	3	NA	3	3	3	3	3	3
Group 6	3	1	--	2	1	2	NA	3	3	3	3	3
Group 7	2	2	2	2	3	3	3	NA	3	--	3	3
Group 8	2	1	2	2	3	2	3	3	NA	3	3	3
Group 9	2	1	1	2	3	3	3	--	2	NA	--	--
Group 10	1	1	1	1	3	3	3	3	2	--	NA	3
Group 11	2	--	NA	--	2	3	--	3	3	3	3	3
Group 12	2	--	2	2	2	--	3	3	3	3	--	NA
Specifics of Argumentation	*9%*	*0*	*0*	*10 %*	*64%*	*80%*	*100%*	*90%*	*64%*	*89%*	*87%*	*87%*

NA: Group made the presentation, and did not comment (C) for their presentation.
---: Group was absent.
*Both presented in week 8, first additional presentation.
**Both presented in week 16, second additional presentation.
*** Weeks that the author publicly made comments in Facebook group

In week 11, group 5 focused on teaching students city models for second graders. During the class, small groups created different city models and discussed them. As mentioned above, the instructor acknowledged this in the comment, but also gave credit for the groups by mentioning the importance of topic selection. Group 3 criticized this by underlining: "They could not implement argumentation well, since the topic did not fit well with the method. They could not make students inquire about the topic."

Despite the fact that the majority of the groups began discussing specifics about argumentation, two groups did not follow that route. The instructor intervention created a positive impact for Group 3 but this group focused on specifics for several weeks, but then stopped adding these specifics in the last five group presentations. This could be related to group dynamics and some group members missing classes in the last five weeks. Turkish university system allows undergraduate students to be absent 30% for the classes. This gives all students an opportunity to miss four classes. Another group used their right to miss classes by skipping two classes altogether. Group 9 was absent in weeks 13 and 16.

DISCUSSION

In the last two decades many studies have used online environments in education, mostly focusing on in-service teachers (Jeong & Lee, 2008; Koh et al., 2010; Lin et al., 2013) and examples designed for pre-service teachers are very rare. In addition, the literature primarily focused on supporting in service-teachers when engaging in argumentation (Osborne et al., 2004; Simon et al., 2006; McNeill & Krajcik, 2008; McNeill, 2009; McNeill & Knight, 2013), and there are not many examples with studying pre-service teachers (Crawford et al., 2005; Zembal-Saul, 2009).

To begin filling these gaps in teacher education literature, this study focused on using peer feedback as well as instructor feedback through the use of Facebook groups when teaching argumentation, which is also a new emphasis for the new curriculum designed by the Turkish Ministry of Education (MEB, 2013). Pre-service teachers participating in this study had a limited knowledge about argumentation before the course. Besides taking numerous courses in their college education, these seniors also spent almost a year in schools as part of the teaching practice course. But they could not successfully describe activities that engage students with the practice of argumentation

When supporting these students' understanding of argumentation, the emphasis was on understanding the role of using evidence and adding reasoning to their arguments (National Research Council [NRC], 2000; Duschl Schweingruber & Shouse, 2007; McNeill & Krajcik, 2008; Kuhn, 2010; NRC, 2012), and engaging students with online discussions. When combining these two, previous body of literature note, students' struggles to engage in high-quality discussions reported in online environments (Jeong & Lee, 2008; Koh et al., 2010; Lin et al., 2013), and many studies discuss teachers' challenges with reasoning (Crawford et al., 2005; McNeill & Krajcik, 2008; Zembal-Saul, 2009; McNeill & Knight, 2013).

Similar to the previous body of literature, pre-service teachers also struggled to discuss argumentation in the first three weeks. During weeks 7, 8 and 9 almost all of the comments failed to evaluate the quality of the argumentation. This is not a surprising finding since in-service teachers' also struggle when evaluating classroom discussions with an emphasis on argumentation (McNeill & Knight, 2013). In the current study, the findings show a marked increase in pre-service teachers' ability to discuss and critique argumentation at around week 10 when the instructor began to more publicly remind students to focus their peer critiques on the use of argumentation in the presentations of lessons. This change in the quality of student comments is similar to the findings by Koh and colleagues (2010) about the role of the instructor in the online environment having a significant impact during the course. But it is also important to note that when engaging pre-service teachers with the practice of argumentation, discussing bad and good examples played a vital role. Studies focusing on supporting in-service teachers asked teachers to analyse good and bad student arguments (McNeill & Knight, 2013; Delen, 2014). To connect with the studies highlighting the value of examining classroom practices for improving the quality of teaching (Borko, 2004), this was adopted to analysing bad or good student comments in the Facebook page.

IMPLICATIONS

Findings of this study suggest that using Facebook groups can be instrumental when teaching argumentation. But it is important to note that, we first need to teach the model of argumentation before expecting teachers developing strong arguments. Once we examine the group performance in Table 3, week 11 is the moment when all groups specifically discussed reasoning and students submitted the first assignment in the same week. In assignment 1 a majority of them (88%) discussed the reasoning. When supporting students in this process, the author taught argumentation and tried whole class discussions, but making public comments in the group page (Koh et al., 2010) had a bigger impact on students' understanding of argumentation since this process included comparing bad or good arguments (McNeill & Knight, 2013; Delen, 2014). When students' comments started to discuss the quality of argumentation, students also took it to the next level by discussing the role of content in the assignments and group comments. This is also an important finding since, Gotwals and Songer (2010) underlined that the quality of the arguments is strongly related with content understanding.

Finally, it is important to add that, students got credit for all the activities during the course, and this may have had an influence on the results. In addition only elementary teachers participated in the study. For understanding how to use online groups in teacher education, a follow-up study would focus on collecting data from different student groups (e.g. elementary education, science education) studying teacher education in different colleges.

REFERENCES

Achieve. Next Generation Science Standards. *National Research Council: Washington, DC, 2013*.

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher*, *33*(8), 3-15.

Crawford, B. A., Zembal-Saul, C., Munford, D., & Friedrichsen, P. (2005).Confronting prospective teachers' ideas of evolution and scientificinquiry using technology and inquiry-based tasks. *Journal of Research in Science Teaching*, *42*(6), 613-637.

De Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education*, *46*(1), 6-28.

Delen, I. (2014). Supporting Students' Scientific Explanations: A Case Study Investigating The Synergy Focusing On A Teacher's Practices When Providing Instruction And Using Mobile Devices (Unpublished Doctoral Dissertation). Michigan State University, East Lansing, USA.

Delen, I., & Kesercioglu, T. (2012). How Middle School Students' Science Process Skills Affected by Turkey's National Curriculum Change? Journal of Turkish Science

Education (TUSED), *9*(4).

Duschl, R. A., Schweingruber, H. A., & Shouse, A. W. (Eds.). (2007). *Taking science to school: Learning and teaching science in grades K-8.* Washington, DC: National Academies Press.

Gotwals, A. W., & Songer, N. B. (2010). Reasoning up and down a food chain: Using an assessment framework to investigate students' middle knowledge. *Science Education*, *94*(2), 259-281.

Jeong, A. (1996). The Structures of Group Discussions in Online Chats. *Journal of Visual Literacy*, *16*(1), 51-63.

Jeong, A., & Lee, J. (2008). The effects of active versus reflective learning style on the

Processes of critical discourse in computer-supported collaborative argumentation. *British Journal of Educational Technology*, *39*(4), 651-665.

Koc, Y., Isiksal, M. & Bulut, S. (2007). Elementary school curriculum reform in Turkey. International Education Journal, *8*(1), 30-39.

Koh, J. H. L., Herring, S. C., & Hew, K. F. (2010). Project-based learning and student knowledge construction during asynchronous online discussion. *The Internet and Higher Education*, *13*(4), 284-291.

Kuhn, D. (2010). Teaching and learning science as argument. *Science Education, 94*(5), 810 – 824.

Lin, P. C., Hou, H. T., Wang, S. M., & Chang, K. E. (2013). Analyzing knowledge dimensions and cognitive process of a project-based online discussion instructional activity using Facebook in an adult and continuing education course. *Computers & Education*, *60*(1), 110-121.

Mazman, S. G., & Usluel, Y. K. (2010). Modeling educational usage of Facebook. *Computers & Education*, *55*(2), 444-453.

McNeill, K. L. (2009). Teachers' use of curriculum to support students in writing scientific arguments to explain phenomena. *Science Education*, *93*(2), 233-268.

McNeill, K. L., & Knight, A. M. (2013). Teachers' pedagogical content knowledge of scientific argumentation: the impact of professional development on K–12 teachers. *Science Education*, *97*(6), 936-972.

McNeill, K.L., & Krajcik, J. (2008). Scientific explanations: Characterizing and evaluating the effects of teachers' instructional practices on student learning. *Journal of Research in Science Teaching, 45*(1), 53–78.

Milli Eğitim Bakanlığı (MEB, 2013). İlköğretim Kurumları Fen Bilimleri Dersi Öğretim Programı.

National Research Council (2000). *Inquiry and the National Science Education Standards: A guide for teaching and learning.* Washington, D. C.: National Academy Press.

National Research Council. (2012). *A Framework for K-12 science education: Practices, crosscutting concepts, and core ideas.* Committee on a Conceptual Framework for New K-12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

Osborne, J., & Dillon, J. (2008). *Science education in Europe: Critical reflections. A report to the Nuffield Foundation.* London: King's College.

Osborne, J., Erduran, S., & Simon, S. (2004). Enhancing the quality of argumentation in school science. *Journal of Research in Science Teaching*, *41*(10), 994-1020.

Sandoval, W. A., & Reiser, B. J. (2004). Explanation-driven inquiry: Integrating conceptual and epistemic supports for science inquiry. *Science Education, 88,* 345–372.

Simon, S., Erduran, S., & Osborne, J. (2006). Learning to teach argumentation: Research and development in the science classroom. *International Journal of Science Education, 28* (2-3), 235-260.

Strauss, A. & Corbin, J. (1998). *Basics of qualitative research*(2nd Edition). Thousand Oaks, CA: Sage.

Toulmin, S. (1958). *The uses of argument.* Cambridge, UK: University Press.

Zembal, Saul, C. (2009). Learning to teach elementary school science as argument. *Science Education*, *93*(4), 687-719.

Turkish Abstract
Facebook Gruplarını Kullanarak Argümantasyonu Öğretmek

Argümantasyon bugün Avrupa ve Amerika'da yaygın bir şekilde programlarda vurgulanmıştır. Geçtiğimiz 20 yıldaki alanyazına bakıldığında birçok çalışma öğrencilerin bu süreçte zorlandığını göstermektedir. Başka bir açıdan bakıldığında öğretmenlerin de bu süreci desteklemede sorun yaşadığı görülmektedir. Maalesef bu konuda öğretmen adaylarıyla yapılan çok az çalışma mevcuttur. Bu çalışma, Facebook gruplarını bir tartışma aracı olarak kullanarak öğretmen adaylarının argümantasyon sürecine katılımlarını desteklemeyi hedeflemektedir. Bu çalışmadaki derse başlamadan önce öğretmen adaylarının (N=58) hiçbiri argümantasyon konusunda verilerini bilimsel nedenlerle açıklayan bir etkinlik tasarlayamamıştır. Ders boyunca 12 grup sunum yapmış ve diğer gruplar bu sunumlar üzerine yorum yapmıştır. Dersi veren öğretim üyesi daha iyi performans gösteren grup hakkında açık bir şekilde Facebook sayfasından yorum yapmaya başlayınca, öğrencilerin verdiği cevaplardaki yorum düzeyleri argümantasyon hakkında daha fazla detay içermeye başlamıştır. Bu olumlu değişiklik neredeyse etkinlik tasarlayan bütün öğrencilerin dersin sonunda verilerini bilimsel nedenlerle açıklama noktasına odaklanma konusunda ilerleme kaydettiğini göstermektedir.

Anahtar Kelimeler: öğretmen eğitimi, sosyal ağ, argümantasyon, online tartışma, eğitimci rolü, etkinlik tasarımı

French Abstract
Enseignement d'Argumentation avec Utilisation de Groupes Facebook

Aujourd'hui l'argumentation est largement soulignée dans les documents de politique en Europe et les EU. Une fois que nous regardons la littérature dans les deux dernières décennies, beaucoup d'études les défis des étudiants célèbres. Sur le revers de la médaille, nous voyons des professeurs en cours d'emploi ayant aussi des problèmes de supporter ce processus. Malheureusement, très peu d'études se sont concentrées sur cette question avec des professeurs de pré service étudiant. En utilisant groupes Facebook comme un outil de discussion, cette étude accents de soutien de professeurs de pré service en engageant dans argumentation. Avant le départ du cours aucun de professeurs de pré service (N=58) ne pourrait concevoir une activité qui inclut la justification de la preuve(l'évidence) (le raisonnement). Pendant le cours, 12 groupes ont fait des présentations et d'autres groupes ont critiqué ces présentations. Une fois que l'instructeur a publiquement commencé à faire des commentaires dans la page Facebook discuter quels groupes ont de meilleurs résultats, le niveau de critique dans des réponses d'étudiant a commencé incluant plus de détails de l'argumentation. Ce changement positif supporté presque tous les étudiants concevant les activités qui se concentrent sur la preuved'utilisation et la connexion au raisonnement à la fin du cours.

Mots Clés: enseignement de professeur, réseaux sociaux, argumentation, discussions en ligne, le rôle d'instructeur, design d'activité

Arabic Abstract

تعليم المناقشة مع استخدام مجموعات الفيسبوك

أن المناقشة اصبحت اليوم مهتما على نطاق واسع م في وثائق السياسات في أوروبا والولايات المتحدة. عندما ننظر مرة إلى الأدب في العقدين الأخيرين، أشارت العديد من الدراسات تحديات الطلاب في هذه الطريقة. وعلى الجانب الآخر نحن نرى في خدمة المعلمين أيضا وجود مشاكل لدعم هذا المنهج . للأسف، وركزت دراسات قليلة جدا بشأن هذه المسألة مع دراسة المعلمين قبل الخدمة. باستخدام مجموعات الفيسبوك كأداة المناقشة، وتركز هذه الدراسة على دعم المعلمين قبل الخدمة عند الانخراط في الجدل. قبل البدء في أي دورة من المعلمين قبل الخدمة (N = 58) يمكن أن تصميم النشاط الذي يشمل تبرير الأدلة (المنطق). وخلال الدورة، قدمت 12 مجموعة العروض وانتقد الجماعات الأخرى هذه العروض. مرة واحدة بدأ المدرب علنا الإدلاء بتعليقات في صفحة الفيسبوك لمناقشة الجماعات التي تقدم أداء أفضل، بدأ مستوى نقد في استجابات الطلاب بما في ذلك مزيد من التفاصيل حول الحجج. هذا التغيير الإيجابي يدعم تقريبا تصميم أنشطة جميع الطلاب التي تركز على استخدام الأدلة والاتصال المنطق في نهاية الدورة.

الكلمات الرئيسية: تدريب المعلمين، والشبكات الاجتماعية، الجدال والمناقشات عبر الإنترنت، ودور المعلم، تصميم النشاط

German Abstract
Lehre Argumentation mit Facebook Gruppen

Heute wird die Argumentation in den politischen Dokumenten in Europa und den USA betont. Sobald wir die Literatur in den letzten zwei Jahrzehnten betrachten, nahmen viele Studien die Herausforderungen der Schüler in diesem Prozess. Auf der anderen Seite der Medaille sehen wir auch Lehrer, die Probleme haben, diesen Prozess zu unterstützen. Leider haben nur wenige Studien zu diesem Thema mit dem Studium von Pre-Service-Lehrer konzentriert. Durch die Verwendung von Facebook-Gruppen als Diskussions-Tool konzentriert sich diese Studie auf die Unterstützung von Pre-Service-Lehrer bei der Argumentation. Vor Beginn des Kurses konnte keiner der Pre-Service-Lehrer (N = 58) eine Aktivität entwerfen, die die Beweisführung rechtfertigt (Argumentation). Während des Kurses, 12 Gruppen gemacht Präsentationen und andere Gruppen kritisiert diese Vorträge. Sobald der Lehrer öffentlich begonnen, Kommentare auf der Facebook-Seite, um zu diskutieren, welche Gruppen besser sind, begann das Niveau der Kritik in Schüler Antworten begann mehr Details über Argumentation. Diese positive Veränderung stützte fast alle Kursteilnehmer, die Tätigkeiten entwerfen, die auf das Bewegen und das Verbinden mit Argumentation am Ende des Kurses sich konzentrieren.

Schlüsselwörter: lehrerbildung, soziale netzwerke, argumentation, online-diskussionen, rolle des lehrers, tätigkeitsentwurf

Malaysian Abstract
Pengajaran Perdebatan dengan Menggunakan *Facebook* Kumpulan

Hari ini penghujahan secara meluas ditekankan dalam dokumen dasar di Eropah, dan Amerika Syarikat. Apabila kita melihat kesusasteraan dalam dua dekad yang lalu, banyak kajian menyatakan cabaran pelajar dalam proses ini. Pada sudut yang lain, kita lihat dalam guru dalam perkhidmatan juga menghadapi masalah untuk menyokong proses ini. Malangnya, sangat sedikit kajian yang memberi tumpuan kepada guru pra-perkhidmatan. Dengan menggunakan kumpulan Facebook sebagai alat perbincangan, kajian ini memberi tumpuan kepada memberi sokongan kepada guru pra-perkhidmatan apabila melibatkan diri dalam perdebatan. Sebelum memulakan kursus tiada guru pra-perkhidmatan (N = 58) boleh merancang aktiviti yang termasuk mewajarkan bukti (pertimbangan). Dalam kursus ini, 12 kumpulan membuat pembentangan dan kumpulan lain memberikan ulasan terhadap persembahan ini. Setelah pengajar mula secara terbuka membuat komen di laman *Facebook* untuk membincangkan mana kumpulan prestasi yang lebih baik, tahap kritikan dalam jawapan pelajar termasuk maklumat lanjut mengenai perdebatan. Perubahan positif dilihat apabila hampir semua pelajar yang menjalani aktiviti memberi tumpuan kepada menggunakan bukti menyelesaikan masalah.

Kata Kunci: pendidikan guru, rangkaian sosial, perdebatan, perbincangan dalam talian, peranan pengajar, reka bentuk aktiviti

Russian Abstract
Обучение Аргументации с Помощью Группа Facebook

Сегодня аргументация широко подчеркивается в программных документах в Европе и США. Once we look at the literature in the last two decades, many studies noted the problems of students in the process. С другой стороны монеты, мы видим в обслуживании учителей с проблемами чтобы поддержать этот процесс. К сожалению, очень мало исследований сосредоточено на этой проблеме изучая учителей дослужебную. В этом исследовании, используя группу Facebook в качестве инструмента обсуждения поддерживающий учителей дослужебную когда участие в аргументацией. Перед тем, начиная курса ни один из учителей дослужебной (N = 58) может конструировать деятельность, которая включает в себя оправдывающего рассуждение. В ходе курса, 12 групп выступили с докладами и других групп критикуется этих презентаций. Однажды инструктор публично начал делать комментарии в странице Facebook, чтобы обсудить, какие группы выступает лучше, уровень критике в студенческих ответов начал включая более подробную информацию о аргументация. Это положительное изменение поддержанный почти все студенты в проектирование мероприятий, то сосредоточиться на используя фактические данные и подключения рассуждая в конце курса.

Ключевые Слова: педагогическое образование, социальные сети, аргументация, онлайн-дискуссии, роль инструктора, проектная деятельность