ISSN 1303-0485 • **eISSN** 2148-7561
DOI 10.12738/estp.2015.5.2719

Educational Sciences: Theory & Practice • 2015 October • 15(5) • 1363-1372

Received | November 9, 2014
Accepted | October 19, 2015
OnlineFirst | October 30, 2015

Science Teacher Candidates' Portraits of Science Teaching as a Profession by using the Characters in the Movie "3 Idiots"

Ezgi Güven Yıldırım[a]
Gazi University

Abstract
This study aimed to collect the opinions of science teacher candidates on scientists, the teaching profession, and the keys to success in the profession by having them watch a movie called "3 Idiots," which is recommended by the Ministry of Education. This study was designed as phenomenological research. Participants were selected by purposeful sampling and were divided into two groups. The first group comprised 83 teacher candidates who were studying third-grade science education at the Gazi Faculty of Education in the academic year 2012–2013. The other group consisted of 41 teacher candidates who were studying at the Gazi Faculty of Education in the academic year 2013–2014. To collect the data, the study used three semi-structured interview questions. Content analysis, a qualitative data analysis method, was chosen to analyze the data. One of the results of the study was that the teacher candidates emphasized the personal traits of the characters Rancho and Chatur in describing the qualifications that a scientist needs to have, and many candidates stated that they had realized that Rancho's character effectively represented scientists. Another finding was that the candidates described the qualifications of a good science teacher using two themes: personal traits and vocational adequacies. As they gave their opinions about the question, the teacher candidates took from Rancho's personal and vocational sufficiency. Lastly, the teacher candidates responded to one question by considering the characters in the movie; many of them felt that the key to success in any profession is to love it.

Keywords: Scientists • Teaching profession • Successful in the profession • 3 Idiots Movie

a **Correspondence**
Ezgi Güven Yıldırım (PhD), Department of Primary Education, Division of Science Education, Gazi Faculty of Education, Gazi University, Ankara Turkey
Research areas: Science education; Environmental education; Scale development; Alternative assessment; Project based learning
Email: ezgiguven@gazi.edu.tr

Along with the continuous development of the world, the necessity is also increasing of raising individuals who can keep up with developments and fulfill requirements and who research, criticize, question, realize themselves, and have high self-esteem (Anıl, 2009). Science education plays a great part in raising individuals who can keep up with current developments. Harlen (1999) and Litcfield and Mattson (1989) state that science plays a key role in improving questioning, critical thinking, problem solving, decision making, and communication skills. In nurturing potential scientists, it is necessary that the items taught be meaningful for students and related to daily life. When the taught material is related to daily life, it becomes meaningful and permanent for the students.

Objectifying teaching, making connections, and preparing the teaching environment according to these criteria are among the duties of a teacher (Akgül, 2010). In this sense, there are certain characteristics and vocational qualifications of the teachers who produce individuals who are appropriate for the necessities of the time. They are explained by Çelikten, Şanal, and Yeni (2005, pp. 216-217) as follows: qualified teachers treat students patiently, controlling their emotions. They are respectful and conciliatory toward different religious or opinion groups. They are open to improving and criticizing themselves. They motivate students and focus on success. They are supportive in the expectation of high success, and they serve as models for students with their thoughts and behaviors. They are trustworthy, honest, objective, cheerful, tolerant, and affectionate in addition to holding leadership qualifications. The vocational qualifications of effective teachers are stated as follows: knowing students' problems—their physiological, emotional, and social features—and acting accordingly. They attempt to develop students' problem-solving skills and systematic and creative thinking skills. They help produce individuals who can apply what they have learned, and they evaluate students' achievement objectively using reliable and valid testing and measurement techniques. They make students aware that learning is a lifelong process. By creating independent classroom environments, good teachers attempt to ensure that their students are sociable and self-actualizing. A good science teacher uses a variety of teaching methods, technical strategies, and teaching materials because the more senses are involved in the teaching process, the more permanent the learning becomes and the longer the students will remember what they have learnt. In this sense, visual and audio learning objects enable teachers to increase the chances of more permanent learning (Seferoğlu, 2006).

A learning object is any reusable digital source that supports learning (Polsani, 2003, p. 77; Wiley, 2002). According to South and Monson (2000), learning objects comprise a wide range of digital media from mind maps and graphs to video and interactive simulations, all designed or used to realize the aims of teaching. Educational movies have also been a common learning object for 50 years (Depover, Giardina, & Marton, 1998), and they are necessary for success in the learning–teaching process (Wenger, 1943). Such movies are prepared to give information about specific topics (Michel, Roebers, & Schneider, 2007). Before beginning more complicated subjects, teachers have found out that educational movies can be used as "advance organizers" (Michel et al., 2007), and popular science fiction movies contribute to students' making sense of scientific concepts and forming mental schema (Barnett et al., 2006). Moreover, Öztaş (2008) put forward that pausing and discussing movies while the subject matter is taught is an effective technique. Birkök (2008) states in his research that movies are effective for delivering comprehensive and intensive information to the masses. Furthermore, Whiteman (2009) indicates that documentaries can be used to reach and teach the masses. However, researchers underline the necessary precautions for ensuring that educational movies are used suitably for their purposes. Bruner (2008) implies that educational movies should be used correlatively with other teaching methods and techniques, and Küçükahmet (2011) says that not only educational movies but also all educational tools should be used under the guidance of teachers, not in place of them. Demircioğlu (2007), however, states that movies can have a number of limitations such as pacifying students or being unsuitable for them, leading to negative comments or prejudices.

According to McCormick (2007), in teacher training institutions or schools, it may be useful and effective to use movies that are embodied with school or teaching themes in establishing positive attitudes toward the teaching profession by serving as models for students. This study aimed to collect the opinions of science teacher candidates about scientists, the teaching profession, and the methods to be successful in the profession by having them watch a movie called "3 Idiots," produced in 2009, which was suggested by the Ministry of Education, in 2013 (Milli Eğitim Bakanlığı, 2013).

Method

This study was designed as phenomenological research, one of the qualitative research methods. In this research study, teacher candidates were asked to watch a movie and then were given directed interview questions about certain concepts that they knew but could not comprehend fully and deeply by referring to the story in the movie. In this sense, phenomenology was a suitable research base for the study because it aims to investigate concepts that are not completely unfamiliar to the candidates but that are known to be not comprehended fully (Yıldırım & Şimşek, 2008).

The base of phenomenological research consists of personal lives and experiences (Akturan & Esen, 2008). Researchers are interested in individuals' subjective experiences and in investigating the effects of phenomena on people's personal opinions, experiences, or lives. In this study, interviews were held to enable participants to present their personal opinions, and these opinions were examined carefully.

Participants

Participants whose input was collected were selected by purposeful sampling, which enables researchers to select individuals who can help to answer research study questions (Cohen, Manion, & Morrison, 2007). In this study, the researchers chose the Gazi Faculty of Education as the study zone because it was easily accessible, and science teacher candidates' images of a typical science teacher was chosen as the research subject. The working groups' intentions to take the science technology program and planning course were taken as a measure. First, the course was held during one semester in the working groups. Then, "3 Idiots" was shown to the working groups in the last week of study. The study was repeated the next year to eliminate random errors in the measurement and to gather more reliable data. For that reason, there were two different study groups. One was a group of 83 teacher candidates who were studying third-grade science education at the Gazi Faculty of Education in the academic year 2012–2013, and the other was 41 teacher candidates who were studying third-grade elementary science education at the Gazi Faculty of Education in the academic year 2013–2014.

Data Collection Tools

To collect the data, the study used three semi-structured interview questions that related to the movie:

- Examine the characters Rancho and Chatur considering the qualifications that are needed to be a scientist.
- Explain the qualifications of a good science teacher considering the movie.
- Examine the keys to success in a profession considering the stories in the movie.

The study used semi-structured interviews because they provide certain and detailed descriptions related to a study's topic (Punch, 2005). To accomplish this, the researcher designed an interview form for the study and followed the same order for all interviews. The candidate interview questions prepared by the researcher were presented to experts in the field of measurement, evaluation, and science education; necessary changes were made in line with the experts' suggestions. Then, all participants were invited to interview at their convenience. Participants were interviewed individually, and each interview lasted between 5 and 7 minutes. All of the data that were collected from the interviews were transcribed and recorded with the consent of the participants. Because the students used their own names, they were each re-identified as F_1, F_2, F_3… for the first-year candidates and S_1, S_2, S_3… for the second-year candidates.

Data Collection

Before the study began, educational movies and sources on their use in science education were scanned and analyzed carefully. Then, the movie "3 Idiots" was selected for use because it was appropriate for the purpose of the study. The study was conducted for two years, in the spring terms of the 2012–2013 and 2013–2014 academic years to check whether the data collected would be consistent. In both years, science teacher candidates were asked to watch "3 Idiots" in the classroom, and then they were interviewed about their opinions.

Data Analysis

The steps indicated by Miles and Huberman (1994) and Yıldırım and Şimşek (2008) were followed in the data analysis; content analysis, one of the qualitative data analysis methods, was chosen. The first step in the analysis was to convert the data into written documents. In the next step, a coding key was created to indicate on which themes the codes would be prepared and given. Then, coded expressions were translated into themes by rearranging them according to their similarities and

differences. After the themes were created, tables were created that showed the themes, codes, and code utterance frequencies in the students' responses. The written interview transcripts were analyzed with the HyperRESEARCH™ 2.6.1 qualitative analysis program.

Findings

This study gathered the opinions of science teacher candidates on scientists, the teaching profession, and the keys to being successful in the profession. The students were first asked to watch "3 Idiots," and then they were asked three open-ended questions. In this section, data collected for each question are shown in tables below.

The first question was "Examine the characters Rancho and Chatur considering the qualifications that scientists need to have." The responses are shown in Table 1.

Based on their responses, the teacher candidates appeared to examine the characters Rancho and Chatur on the basis of two themes. Direct quotations from the students are given below. F_{13} answered the questions as follows.

> *Rancho believes that learning doesn't take place just by reading. He argues that learning by applying should be taken into consideration along with learning by reading; as a matter of fact, learning by applying should be more profound than memorizing. He thinks that each piece of information that is memorized is forgotten eventually; however, when it is supported with applying, it becomes permanent information. In contrast, Chatur is preparing for all of the exams by memorizing the books. He finds applying unimportant. Both of them are mechanical engineering students, but Chatur only learns theoretical knowledge. Of course, a scientist must know theoretical knowledge, but one cannot become a scientist by memorizing books. This knowledge should be used in real life and provide benefits to human beings and nature. Namely, scientists must use the knowledge they acquire.* (F_{13} - 364.782, 03.07.2014)

F_{15} answered the question by explaining the qualifications of both characters and defined the features of scientists by the characters' differences:

> *Rancho is a character who desires to research; who is curious, open to learning, and practical-minded; who can approach events without sticking to the information in the books; who is a good observer; who isn't afraid of making mistakes; who is courageous, open to innovation, and free-spirited. On the other hand, Chatur is a character who leans on memorizing, accepts events as they are, isn't open to innovation, and ignores others in order to achieve something. When these two characters are examined, the features scientists need to have are being curious, being able to conduct research, staying open to innovation, not being afraid of making mistakes, taking pleasure from the inventions that s/he made or works, producing new ideas using his/her brain beyond stereotypical information, being able to observe his/her environment carefully, and presenting new products by combining information and carrying out examinations. All of these features point out Rancho's character.* (F_{15} - 312.239, 03.07.2014)

Again, teacher candidates F_{26} and S_{28} defined the qualifications that a scientist should have with reference to the differences between the two characters and exemplified the character Rancho as a good scientist in terms of his qualifications.

> *In the movie, Chatur is depicted as a character who memorizes knowledge as it is and refuses to understand or think about it. The character Rancho, on the other hand, is depicted as questioning, criticizing, trying to understand the knowledge, taking pleasure from the activities, which include research and production. It is obvious that Rancho has the features that a scientist needs to have when these two character are examined because just like a scientist, he does research on the knowledge, questions it, criticizes it, and takes pleasure from producing and using his practical intelligence. Also, he refuses to stick to the books or formulas while he accomplishes these. He finds examples from the uses of knowledge in real life and tries to produce. Therefore, the features that a scientist needs to have are seen in Rancho. Chatur is a character, on the other hand, who is only successful at exams due to rote learning and doesn't know producing and doing research.* (F_{26} - 376.534, 03.07.2014)

> *…Rancho learned the knowledge and put forward new ideas through thinking about it instead of memorizing it. The important qualifications that a scientist should have are curiosity, excitement, researching, and fancifulness. In the movie, Rancho saved the baby's life by thinking fast and creating practical inventions. Rancho's aim was to learn. When he graduated, the diploma wasn't his. What was needed in order to become a scientist wasn't a diploma but the knowledge of how to use the knowledge. Chatur preferred imprudent*

Table 1
Frequency Data of Teacher Candidates' Answers to First Question

Themes	Codes /Rancho		Frequency	Codes/Chatur		Frequency
In terms of personality traits	Curious	F_4, F_7, F_8, F_{12}, F_{14}, F_{15}, F_{16}, F_{17}, F_{24}, F_{27}, F_{28}, F_{31}, F_{32}, F_{34}, F_{37}, F_{39}, F_{40}, F_{41}, F_{42}, F_{43}, F_{46}, F_{47}, F_{48}, F_{49}, F_{50}, F_{52}, F_{54}, F_{56}, F_{59},F_{60}, F_{61}, F_{65}, F_{66}, F_{71}, F_{73}, F_{76}, F_{80}, F_{81}, S_1, S_3, S_6, S_8, S_9, S_{10}, S_{15}, S_{20}, S_{22}, S_{23}, S_{28}, S_{29}, S_{31}, S_{32}, S_{33}, S_{36}, S_{37}, S_{38}, S_{41}	57	Money-loving	F_1, F_{28}, F_{31}, F_{35}, F_{36}, F_{37}, F_{38}, F_{39}, F_{40}, F_{41}, F_{42}, F_{46}, F_{49}, F_{64}, F_{70}, F_{71}, S_{14}, S_{16}, S_{18}, S_{20}, S_{24}, S_{26}, S_{27}, S_{28}, S_{31}, S_{33}, S_{35}, S_{36}, S_{37}, S_{38}, S_{41}	31
	Creative	F_8, F_{20}, F_{24}, F_{27}, F_{32}, F_{41}, F_{43}, F_{44}, F_{45}, F_{46}, F_{49}, F_{56}, F_{59}, F_{61}, F_{64}, F_{72}, F_{73}, F_{76}, F_{77}, F_{82}, S_{29}, S_{33}	22	Ambitious	F_{16}, F_{24}, F_{30}, F_{32}, F_{36}, F_{37}, F_{45}, F_{61}, F_{82}, S_{15}, S_{17}, S_{32}, S_{36}	13
	Innovator	F_8, F_{15}, F_{16}, F_{17}, F_{18}, F_{24}, F_{27}, F_{34}, F_{38}, F_{43}, F_{49}, F_{56}, F_{61}, F_{72}, F_{73}, F_{77}, F_{78}, F_{80}, F_{82}, S_{16}, S_{25},	21	Incurious	F_4, F_{41}, F_{43}, F_{65}, F_{71}, F_{81}, S_{10}, S_{19}, S_{21}, S_{31}, S_{38}	11
	Free	F_1, F_3, F_4, F_6, F_{15}, F_{17}, F_{18}, F_{53}, F_{58}, F_{76}, F_{78}, F_{80}, F_{82}, S_{26}	14	Non-creative	F_{11}, F_{26}, F_{29}, F_{30}, F_{34}, F_{39}, F_{46}, F_{49}, F_{58}, F_{59}, F_{77}, S_{17}	12
	Willing	F_7, F_8, F_{18}, F_{22}, F_{38}, F_{31}, F_{42}, F_{43}, F_{47}, F_{64}, F_{70}, F_{71}	12	Racer	F_{20}, F_{22}, F_{34}, F_{55}, F_{57}, F_{59}, F_{60}, F_{76}, S_{13}, S_{15}, S_{40}	11
	Decided	F_{18}, F_{24}, F_{32}, F_{52}, F_{56}, F_{65}, F_{81}, S_{13}, S_{15}, S_{40}	10	Non-innovator	F_4, F_{15}, F_{17}, F_{20}, F_{29}, F_{39}, F_{46}, F_{63},	8
	Objective	F_{31}, F_{33}, F_{37}, F_{56},F_{61}, F_{66}, F_{76}	7	Selfish	F_1, F_{35}, F_{39}, F_{51}, F_{82}, S_{30}	6
	Different viewpoint	F_4, F_{51}, F_{59}, F_{74},	4	Self-seeker	F_{31}, F_{51}, F_{81}, S_{27}	4
	Strong minded	F_{66}, F_{64}, F_{82},S_{17}	4	Decided	F_{24}	1
In terms of learning features	Practitioner in daily life	F_2, F_4, F_7, F_9, F_{11}, F_{12}, F_{13}, F_{18}, F_{23}, F_{24}, F_{26}, F_{28}, F_{32}, F_{34}, F_{35}, F_{36}, F_{40}, F_{44}, F_{47}, F_{48}, F_{51}, F_{55}, F_{56}, F_{74}, F_{79}, F_{82}, S_1, S_6, S_{11}, S_{19}, S_{20}, S_{21}, S_{22},S_{26}, S_{34}, S_{36}, S_{37}, S_{38}, S_{39}, S_{40}, S_{41}	41	Rote-learning	F_1, F_2, F_3, F_4, F_5, F_6, F_7, F_8, F_9, F_{10}, F_{11}, F_{12}, F_{13} F_{15}, F_{16}, F_{17}, F_{18}, F_{19}, F_{20}, F_{21}, F_{22}, F_{23}, F_{25}, F_{26}, F_{27}, F_{28}, F_{29}, F_{32}, F_{33}, F_{34}, F_{35}, F_{36}, F_{37}, F_{38}, F_{39}, F_{40}, F_{41}, F_{42}, F_{43}, F_{45}, F_{46}, F_{47}, F_{48}, F_{49}, F_{50}, F_{51}, F_{54}, F_{55}, F_{57}, F_{58}, F_{59}, F_{60}, F_{61}, F_{62}, F_{65}, F_{66}, F_{67}, F_{68}, F_{71}, F_{72}, F_{74}, F_{76}, F_{77}, F_{78}, F_{79}, F_{80}, F_{82}, F_{83}, S_1, S_2, S_3, S_4, S_6, S_8, S_9, S_{10}, S_{11}, S_{12}, S_{13}, S_{14}, S_{15}, S_{16}, S_{18}, S_{19}, S_{20}, S_{21}, S_{23}, S_{24}, S_{25}, S_{26}, S_{27}, S_{28}, S_{29}, S_{30}, S_{31}, S_{32}, S_{34}, S_{35}, S_{36}, S_{37}, S_{38}, S_{39}, S_{41}	103
	Researcher	F_4, F_6, F_8, F_{10}, F_{12}, F_{15}, F_{16}, F_{17}, F_{18}, F_{27}, F_{20}, F_{29}, F_{33}, F_{37},F_{38}, F_{39}, F_{40}, F_{44}, F_{46}, F_{50}, F_{54}, F_{56}, F_{59}, F_{66}, F_{67}, F_{68}, F_{78}, F_{81}, S_1, S_3, S_8, S_{10},S_{20}, S_{28}, S_{40}	35	Non- querier	F_1, F_{10}, F_{33}, F_{34}, F_{38}, F_{39}, F_{52}, F_{53}, F_{54}, F_{73}, F_{77}, F_{80}, F_{82}, S_5, S_{20},	15
	Not rote-learning	F_6, F_7, F_{12}, F_{13}, F_{18}, F_{22}, F_{24}, F_{26}, F_{35}, F_{51}, F_{54}, F_{55},F_{59}, F_{60}, F_{74}, F_{77}, S_1, S_{19}, S_{20}, S_{26}, S_{28}, S_{39}, S_{40}	23	Non-researcher	F_4, F_7, F_{10}, F_{17}, F_{26}, F_{36}, F_{63}, F_{81}, S_{30}	9
	Ingenious	F_4, F_8, F_{14}, F_{15}, F_{17}, F_{20}, F_{29}, F_{45}, F_{46}, F_{51}, F_{52}, F_{77}, F_{79}, S_{16}, S_{17}, S_{24}, S_{28}, S_{29}, S_{35}, S_{41}	20	Non-practitioner	F_9, F_{13}, F_{24}, F_{40}, F_{51}, F_{68}, F_{74}, S_2	8
	Observer	F_4, F_8, F_{15}, F_{17}, F_{23}, F_{24}, F_{27},F_{34}, F_{49}, F_{56}, F_{61}, F_{65}, F_{76}, F_{81}, F_{82}, S_3, S_{15}, S_{32}, S_{37}, S_{40}	20	Non-observer	F_{27}	1
	Interrogator	F_2, F_5, F_6, F_7, F_{10}, F_{18}, F_{20}, F_{21}, F_{26}, F_{30}, F_{34}, F_{38}, F_{40}, F_{43}, F_{44}, F_{46}, F_{50},F_{53}, F_{60},F_{73},	20			
	Open to learning	F_4, F_{15}, F_{17}, F_{55}, F_{60}, F_{64}, F_{71}, F_{70}, S_4, S_6, S_9, S_{10}, S_{27}, S_{28}, S_{41}	15			
	Thinking	F_{27}, F_{32}, F_{40}, F_{43}, F_{49}, F_{50}, F_{59}, S_{24}	8			
	Problem solver	F_{34}, F_{46}, F_{75}, S_{21}	4			

learning to understand the wonders of the science in a funny way. He wanted to become a scientist in order to become wealthy and influential. He didn't know how to put theoretical knowledge into practice and use it. (S_{28} - 405.113, 03.07.2014)

The second question was "Explain the qualifications of a good science teacher considering the movie." The students' responses are shown in Table 2.

Table 2
Frequency Data of Teacher Candidates' Answers to Second Question

Themes	Codes		Frequency
Vocational sufficiency	Should teach lessons practical	F_1, F_2, F_7, F_9, F_{10}, F_{11}, F_{12}, F_{13}, F_{14}, F_{15}, F_{16}, F_{17}, F_{18}, F_{21}, F_{22}, F_{25}, F_{26}, F_{31}, F_{32}, F_{33}, F_{34}, F_{35}, F_{36}, F_{39}, F_{40}, F_{45}, F_{46}, F_{47}, F_{48}, F_{49}, F_{51}, F_{52}, F_{55}, F_{56}, F_{59}, F_{61}, F_{62}, F_{64}, F_{65}, F_{66}, F_{67}, F_{68}, F_{69}, F_{71}, F_{72}, F_{73}, F_{74}, F_{76}, F_{77}, F_{79}, F_{81}, F_{82}, F_{83}, S_2, S_5, S_6, S_8, S_9, S_{11}, S_{13}, S_{17}, S_{20}, S_{21}, S_{22}, S_{24}, S_{25}, S_{26}, S_{27}, S_{28}, S_{29}, S_{30}, S_{31}, S_{32}, S_{33}, S_{35}, S_{36}, S_{37}, S_{39}, S_{41}	78
	Should configure the learning environment well (method, technique, activity, film, project)	F_3, F_5, F_7, F_{10}, F_{13}, F_{14}, F_{15}, F_{17}, F_{19}, F_{20}, F_{21}, F_{22}, F_{23}, F_{25}, F_{27}, F_{30}, F_{31}, F_{37}, F_{38}, F_{41}, F_{43}, F_{44}, F_{45}, F_{46}, F_{47}, F_{51}, F_{54}, F_{55}, F_{56}, F_{58}, F_{61}, F_{62}, F_{63}, F_{66}, F_{67}, F_{68}, F_{73}, F_{75}, F_{79}, F_{80}, F_{81}, F_{82}, S_2, S_8, S_9, S_{10}, S_{12}, S_{13}, S_{14}, S_{15}, S_{16}, S_{18}, S_{20}, S_{21}, S_{23}, S_{24}, S_{30}, S_{35}	59
	Should be a good guide	F_1,F_3, F_4, F_5, F_6, F_9, F_{10}, F_{11}, F_{16}, F_{24}, F_{26}, F_{28}, F_{31}, F_{32}, F_{36}, F_{40}, F_{41}, F_{46}, F_{51}, F_{52}, F_{54}, F_{59}, F_{64}, F_{68}, F_{69}, F_{76}, F_{77}, F_{82}, S_2, S_4, S_5, S_6, S_9, S_{10}, S_{12}, S_{14}, S_{16}, S_{18}, S_{19}, S_{20}, S_{25}, S_{28}, S_{33}, S_{34}, S_{35}, $S_{37,}$ S_{41}	47
	Should research- interrogate- think	F_1, F_4, F_6, F_8, F_{10}, F_{23}, F_{24}, F_{32}, F_{37}, F_{38}, F_{43}, F_{44}, F_{45}, F_{53}, F_{57}, F_{59}, F_{64}, F_{66}, F_{67}, F_{69}, F_{70}, F_{78}, S_1, S_2, S_6, S_9, S_{10}, S_{14}, S_{17}, $S_{19,}$ S_{20}, S_{26}, S_{28}, S_{29}, S_{30}, S_{31}, S_{32}, S_{36}, S_{37}, S_{38}, S_{39}, S_{40}, S_{41}	43
	Should communicate with students	F_2, F_9, F_{11}, F_{16}, F_{18}, F_{19}, F_{24}, F_{26}, F_{28}, F_{33}, F_{42}, F_{43}, F_{47}, F_{49}, F_{52}, F_{53}, F_{57}, F_{60}, F_{64}, F_{73}, F_{74}, F_{77}, F_{80}, F_{81}, S_6, S_9, S_{12}, S_{15}, S_{19}, S_{25}, S_{27}, S_{37}, S_{41}	33
	Innovator, should use technology	F_6, F_8, F_{13}, F_{21}, F_{23}, F_{24}, F_{34}, F_{35}, F_{38}, F_{56}, F_{59}, F_{61}, F_{62}, F_{63}, F_{64}, F_{73}, F_{78}, F_{79}, S_{17}, S_{20}, S_{21}, S_{29}, $S_{34,}$ S_{41}	24
	Shouldn't be factious	F_{16}, F_{21}, F_{27}, F_{39}, F_{43}, F_{50}, F_{52}, F_{56}, F_{70}, F_{72}, S_{38}	11
Personal traits	Loves her/his job	F_1, F_7, F_{10}, F_{17}, F_{18}, F_{19}, F_{20}, F_{22}, F_{25}, F_{26}, F_{29}, F_{37}, F_{42}, F_{46}, F_{47}, F_{48}, F_{49}, F_{50}, F_{51}, F_{52}, F_{55}, F_{56}, F_{60}, F_{70}, F_{71}, F_{72}, F_{74}, F_{76}, F_{78}, S_{10}, S_{14}, S_{15}, S_{19}, S_{21}, S_{23}, S_{25}, S_{32}, S_{34}, S_{35}, S_{37}, S_{38}, S_{40}, S_{41}	43
	Shouldn't be oppressive (exams, scores)	F_1, F_7, F_{10}, F_{17}, F_{18}, F_{19}, F_{20}, F_{22}, F_{25}, F_{26}, F_{29}, F_{35}, F_{42}, F_{46}, F_{47}, F_{48}, F_{49}, F_{50}, F_{51}, F_{52}, F_{55}, F_{56}, F_{60}, F_{70}, F_{71}, F_{72}, F_{74}, F_{76}, F_{78}, S_{10}, S_{14}, S_{15}, S_{19}, S_{21}, S_{23}, S_{25}, S_{32}, S_{34}, S_{35}, S_{37}, S_{38}, S_{40}, S_{41}	43
	Should be tolerant- loving	F_4, F_9, F_{18}, F_{24}, F_{26}, F_{27}, F_{33}, F_{39}, F_{43}, F_{49}, F_{51}, F_{53}, F_{56}, F_{57}, F_{58}, F_{60}, F_{69}, F_{70}, F_{71}, F_{81}, S_3, S_{11}, S_{12}, S_{17}, S_{19}, S_{23}, S_{26}, S_{31}, S_{34}, S_{35}, S_{36}, S_{37}, S_{40}	33

The students classified the necessary qualifications for a good science teacher into two themes, vocational sufficiency and personal traits. Some responses are below:

> *We know that the aim of a good science teacher is to produce individuals who are literates of science. As to the movie, a science teacher should love his/her profession, be related with science, be curious, make students curious about science. S/he should know the ways to gather knowledge and widen students' horizons by forcing them to think. S/he should make students perceive the role of science in our lives, interact successfully, be social and objective. S/he shouldn't discriminate against students and should take pleasure from teaching.* (F_{16} - 792.191, 03.07.2014)

> *A good teacher should first be a researcher, objective and curious. S/he shouldn't accept what is controversial with his/her logic. S/he should be a good model for students. S/he should attract students' attention to the lesson, know that each student is unique, and apply different teaching methods considering the differences. Most importantly, s/he should love the profession.* (F_{37} - 692.901, 03.07.2014)

> *S/he should love the profession, consider students' interests and skills, make the lesson interesting, introduce science with the support of examples from real life and shouldn't evaluate students just by their grades.* (S_{35} - 673.204, 03.07.2014)

The teacher candidates were last asked to "examine the keys of success in a profession by considering the stories in the movie," and their responses are shown in Table 3.

Overall, the students' responses reflected that they felt the key to success in the profession mostly depends on doing the job lovingly. The least expressed keys were determination and curiosity.

> *The key to success in a profession is first to love the profession you will have. People mostly fail when they pick a profession they don't like for the sake of having influence or earning more money. First of all, people should love the profession they will have. They achieve more and more without losing their resolution against all difficulties of the profession when they try to do their job to the best of their ability. Moreover, if you would like to be successful at your profession, you should sustain it thoroughly. In short, if you do your job lovingly and tastefully, then you will be successful at it.* (F_{24} - 743.696, 03.07.2014)

Table 3
Frequency Data of Teacher Candidates' Answers to Third Question

Codes		Frequency
Doing job lovingly	$F_{1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 67, 70, 71, 72, 73, 74, 75, 76, 79, 80, 82, 83, S_{2, 3, 4, 6, 7, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41}$	110
Select job without pressure	$F_{3, 6, 7, 9, 11, 12, 14, 15, 17, 18, 19, 20, 24, 25, 29, 34, 35, 36, 38, 42, 43, 47, 49, 51, 54, 55, 56, 58, 59, 61, 66, 68, 71, 72, 74, 76, 78, 80, S_{9, 12, 13, 24, 25, 29, 31, 37, S40}$	47
Be disposed	$F_{2, 4, 5, 14, 15, 16, 18, 24, 29, 30, 31, 32, 42, 46, 48, 50, 51, 52, 57, 59, 60, 61, 64, 67, 68, 69, 73, 75, 82, 6, 8, 9, 10, 12, 13, 18, 20, 22, 25, 28, 32, 35, 40, S41}$	44
Improve oneself	$F_{2, 4, 6, 14, 18, 21, 23, 26, 33, 34, 39, 45, 46, 50, 53, 56, 61, 64, 70, 79, S_{16, 17, 20, 21, 22, 25, 26, 27, 28, 31, 40, S41}$	32
Be keen on	$F_{7, 8, 16, 20, 28, 29, 34, 39, 47, 53, 56, 63, 76, S_{3, 4, 5, 10, 15, 21, 23, 31, 37, 38, 39, 40, S41}$	26
Be determined	$F_{4, 10, 12, 18, 21, 32, 35, 42, 49, 50, 51, 54, 55, 56, 64, 66, 79, 81, S_{6, 10, 11, 15, 25, 32, 33, S39}$	27

Note that nearly all of the teacher candidates gave the response "The key to success in the profession is to love it." Below are some of their responses:

> *First, the key to success in a profession is to love it. The character Farhan loves photography but studies engineering because his family forces him to do so. If he had continued going to school and become an engineer, he would have been unhappy about doing a job he didn't like and failed. Instead, he becomes a successful photographer and releases a lot of books. Raju, on the other hand, has a fear of failure, and he gains success by overcoming it. Since Rancho loves his profession and produces new tools all the time, he becomes a well-known scientist. To sum up, the keys to success in the profession are to love it, to not be afraid of failure, and to reach perfection.* (F_{42} - 724.411, 03.07.2014)

> *If we want to be successful at a profession, first we should love it and be interested with it. We should study in order to get it. Farhan's family, in the movie, wants him to become an engineer and puts pressure on him. So, he fails. However, then, he becomes successful since he does the job he likes and is gifted for.* (S_{31} - 603.811, 03.07.2014)

Conclusion and Discussion

This study aimed to examine science teacher candidates' depictions of the science teacher profession considering the characters in the "3 Idiots" movie.

In this study, first, the students' responses to the research questions were divided on the basis of theme, code, and code use frequency. When the data in Table 1 are analyzed, it is observed that the teacher candidates emphasized personal traits of the characters Rancho and Chatur in describing the qualifications that a scientist needs to have. The students described the character Rancho with terms such as curious, researcher, ingenious, and lover of learning, questioning, and thinking. For the character Chatur, codes such as rote learner, not researching, not questioning, ambitious, and competitor were identified. The teacher candidates defined the qualifications that a scientist should have as researcher, questioning, thinking, open to innovation, curious, applying the knowledge to real life, observer, productive, ambitious, and foreseeing with regard to the two movie characters. When literature in this area is reviewed, scientists are defined similarly in nearly all of the research studies on this subject. For example, according to Ayverdi (1969), a scientist is someone who is curious, attentive, productive, questioning, criticizing, skeptical, a researcher, a method institutor, a correct user of current methods, a person who can state the problem correctly, has true intuition, makes right choices, produces solutions to problems, improves himself/herself, and uses knowledge effectively; who is success-oriented, examines his/her environment carefully, and has the capacity to apply theoretical knowledge in practice. Similar qualifications are underlined in other studies in the literature (Aydoğan, 2008; Doğan Bora, Arslan, & Çakıroğlu, 2006; Kibar Kavak, 2008; Korkmaz, 2004; Ortaş, 2002; Özoğlu, 1994).

As seen, the teacher candidates' opinions about the qualifications that a scientist should have are parallel with the literature. Furthermore, many candidates reported that they realized the character Rancho accurately represented scientists. They expressed that Rancho is a character who is eager to research, curious, open to learning, ingenious; he does not stick to the information in books, approaches events, is a good observer, is not afraid of making mistakes, and is courageous, open to innovation, and free-spirited. The candidates' opinions of scientists became clearer with the character Rancho. Therefore, we may be interpret that educational movies can make concepts and facts

clearer. Additionally in the literature, it is possible to find studies that exemplify that movies make concepts of individuals clearer, make perceiving them easier, and make students more attentive to the topic of the lesson (Barnet et al., 2006; Boyer, Pollard, Kuzma, & Haney, 2002; Duchastel, Fleury, & Provost, 1988; Köklükaya, 2015; Michel et al., 2007; Phillips, 2002).

The next question to the candidates sought their opinion about the qualifications of a good science teacher; Table 2 shows their responses. The students divided the necessary qualifications into two themes, personal traits and vocational adequacies. They stated that a good science teacher should interact with students, focus on researching and questioning, develop an effective learning environment, not discriminate against students but instead guide them, conduct lessons through application, use technology, do their jobs with love, and be tolerant and affectionate rather than oppressive. Other studies show parallel results on the qualifications of a science teacher (Çepni & Bacanak, 2002; Duban, 2010; Işık Terzi, 2008; Keisa, 2009; Morgil & Yılmaz, 1999; Sweeney, 2003; Şahin & Yıldırım, 1999; Taylor, Jones, Broadwell, & Oppewal, 2008; Wayne, 2008).

In giving their opinions, the teacher candidates derived their impressions from Rancho's personal and vocational sufficiency. In their opinion, Rancho was an exemplary science teacher. The students reported that they had learned a great deal from the movie and even found answers to the question "How can I become a good science teacher?" In this way, they empathized with the characters in the movie and reached their own truths. It is indicated in the literature that educational movies improve empathy and contribute to the image of science teachers (Giroux, 1994; Mitchell & Weber, 1999; Phillips, 2002; Robertson, 1995). Moreover, the teacher candidates expressed that they found science more usable and beneficial, and they loved it even more after the movie. In this sense, it is thought that educational movies positively influence attitudes toward science and science learning. In the literature, the results of similar studies show that educational movies have a positive impact on attitudes toward science (Cavanaugh & Cavanaugh, 1996, 2004; Çemrek, Anılan, Anılan, Balbağ, & Görgülü, 2005; Ekem, 1990).

Lastly, the teacher candidates were asked what the key to success was in a profession. Many of them stated that the key is to love one's profession (Table 3). It was their opinion that it is necessary that individuals love the profession, be curious and determined, and attempt to improve themselves in the profession and to choose a profession without any family or societal pressure. When the literature is analyzed, it is underlined that it is important to have the characteristics that the students identified in this study.

The teacher candidates' responded to this question by considering the characters in the movie. Most of them emphasized that Farhan did not succeed because he did not like the profession and Raju failed because of his family's pressure and his fears, whereas Rancho achieved great things because he had committed to the profession passionately, he was willing and curious, and most importantly, he loved his job greatly. Nearly all of the candidates found common ground in "If you try to reach for perfection, success will follow you." Their comments on the topic show that they genuinely focused on the topic to answer for themselves the question "What should be done in order to be successful in a profession?" Literature also states that movies draw attention and interest to topics and make learning easier (Duchastel et al., 1988).

The results obtained from this research showed that the "3 Idiots" movie was very useful in terms of describing the characteristics of a scientist and a good science teacher. Again, based on the movie, candidates reached the judgment that the secret to being successful in a profession is to love it. Roberts, Dean, and Nienhuis (2003) reviewed the literature on the use of films for education, and they revealed that films are used in many fields such as psychology, human communication, sociology, guidance, and education. According to these studies, films are very powerful teaching medium because educational movies provide an overall experience about unfamiliar topics and situations, embody the concepts of courses, and offer students the chance to see theory in practice. One of the most important goals of science teaching is to concretize abstract knowledge and to apply theoretical knowledge that is learned in courses. In this respect, educational films are considered to be useful for different subjects and grade levels of science teaching.

References

Akgül, A. (2010). *The relationship between teachers' application-based educational technology and material development skills and their students' proficiency exam* (SBS) (Master's thesis, Afyon Kocatepe University, The Institute of Social Sciences, Afyon, Turkey). Retrieved from https://tez.yok.gov.tr/UlusalTezMerkezi/

Akturan, U., & Esen, A. (2008). *Fenemonoloji [Phenomenology]*. In T. Baş & U. Akturan (Eds.), *Nitel araştırma yöntemleri [Qualitative research methods]* (pp. 83–98). Ankara, Turkey: Seçkin Publishing.

Anıl, D. (2009). Factors effecting science achievement of science students in programme for international students' achievement (PISA) in Turkey. *Education and Science, 34*(152), 87–100.

Aydoğan, İ. (2008). Scientists and intellectual posture. *Girne American University Journal of Social and Applied Sciences, 3*(6), 81–87.

Ayverdi, A. (1969). *Orta eğitimde ve yüksek eğitimin ilk yıllarında bilim adamı yetiştirme [Educate scientist secondary education and the first years of higher education]*. Ankara, Turkey: TÜBİTAK, Scientist Training Group Publishing.

Barnett, M., Wagner, H., Gatling, A., Anderson, J., Houle, M., & Kafka, A. (2006). The impact of science fiction film on student understanding of science. *Journal of Science Education and Technology*, *15*(2), 179–191.

Birkök, M. C. (2008). An alternative socialization technique about use of media in education: Cinema films. *International Journal of Human Sciences, 5*(2), 1–10.

Boyer, M. A., Pollard, V. K., Kuzma, L. M., & Haney P. J. (2002). At the movies: a continuing dialogue on the challenges of teaching with film. *International Studies Perspectives, 3*(1), 89–94.

Bruner, J. (2008). *Educational process* (trans. T. Öztürk). Ankara, Turkey: Pegem Academy Publishing.

Cavanaugh, T., & Cavanaugh, C. (1996, October). *Learning science with science fiction films.* Paper presented at the Annual Meeting of Florida Association of Science Teachers, Key West, FL.

Cavanaugh, T. W., & Cavanaugh, C. (2004). *Teach science with science fiction films: A guide for teachers and library media specialist.* Worthington, OH: Linworth Publishing.

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*. London, UK: Routledge Falmer.

Çelikten, M., Şanal, M., & Yeni, Y. (2005). Teaching profession and features. *Journal of the Institute of Social Sciences*, *19*(2), 207–237.

Çemrek, F., Anılan, B., Anılan, H., Balbağ, M. Z., & Görgülü, A. (2005, September). *The reflection of the science fiction films on the teachers success in science classes.* Paper presented at the XIV. National Education Science Congress, Pamukkale University Faculty of Education, Denizli, Turkey.

Çepni, S., & Bacanak, A. (2002, May). *A study on determining mathematics student teachers' scientific literacy, education: changing times, changing needs.* Paper presented at the First International Conference on Education, Faculty of Education Eastern Mediterranean University, Gazimagusa, Turkish Republic of Nothern Cyprus.

Demircioğlu, İ. H. (2007). *The place and importance of films in history teaching*. *Bilig, 42*, 77–93.

Depover, C., Giardina, M., & Marton, P. (1998). *Les environnements d'apprentissage multimédia*. Paris, France: L'Harmattan.

Doğan Bora, N., Arslan, O., & Çakıroğlu, J. (2006). High school students' ideas about science and scientists. *Hacettepe University Journal of Education Faculty, 31*, 32–44.

Duban, N. (2010). Opinions of primary school teacher candidates about science and technology literate and education these individuals. *Journal of Theoretical Education, 3*(2), 162–174.

Duchastel, P., Fleury, M., & Provost, G. (1988). Rôles cognitifs de l'image dans l'apprentissage scolaire. *Bulletin de Psychologie, 41*(386), 667–671.

Ekem, N. (1990). The effect of science-fiction movies attitudes towards science and personality development on communication of education. *Journal of Fiction, 8,* 501–541.

Giroux, H. (1994). *Disturbing pleasures.* New York, NY: Routledge.

Harlen, W. (1999). Purposes and procedures for assessing science process skills. *Assessment in Education*, *6*(1), 129–144.

Işık Terzi, C. (2008). *Defining the science literacy level of the primary school teachers who conduct science technology lesson in primary grades as well as the science technology teachers who conduct science technology lesson in secondary grades and comparison of the results* (Master's thesis, Muğla University, Institute of Science, Muğla, Turkey). Retrieved from https://tez.yok.gov.tr/UlusalTezMerkezi/

Keisa, V. (2009, February). *Analysis of teacher's professional development.* Paper presented at the International Scientific Conference on Society, Integration, Education. Rezekne, Latvia.

Kibar Kavak, G. (2008). *Students' attitudes towards science and scientists and factors affecting image* (Master's thesis, Selçuk University, Konya, Turkey). Retrieved from https://tez.yok.gov.tr/UlusalTezMerkezi/

Korkmaz, H. (2004). *Fen ve teknoloji eğitiminde alternatif değerlendirme yaklaşımlar [Alternative assessment approaches in science and technology education]*. Ankara, Turkey: Yeryüzü Publishing.

Köklükaya, A. N. (2015). The determination of opinions of pre-service science teachers on the curriculum of science courses on the basis of the 3-Idiots movie. *Journal of Baltic Science Education [JBSE], 14*(3), 366–378.

Küçükahmet, L. (2011). *Öğretim ilke yöntemleri [Principles and methods of teaching]*. Ankara, Turkey: Nobel Publishing.

Litchfield, B. C., & Mattson, S. A. (1989). The interactive media science project: An inquiry based multimedia science curriculum. *Journal of Computers in Mathematics and Science Teaching*, *9*(1), 37–43.

McCormick, P. (2007). *Film school: Teacher-student relationships in movies can be inspirational or downright creepy, but as Catholics it's up to us to help each other learn and grow. U.S. Catholic*. Retrieved 06.06.2014 from http://www.thefreelibrary.com/.

Milli Eğitim Bakanlığı. (2013). *Recommended feature films*. Retrieved 05.07.2014 from http://mebk12.meb.gov.tr/meb_iys_dosyalar/61/06/203820/dosyalar/2015_02/24101434_tavsyeettmzflmler.pdf

Michel, E., Roebers, C. M., & Schneider, W. (2007). Educational films in the classroom: Increasing the benefit. *Learning and Instruction, 17,* 172–183.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook.* Thousand Oaks, CA: Sage.

Mitchell, C., & Weber, S. (1999). *Reinventing ourselves as teachers*. Philadelphia, PA: Falmer Press.

Morgil, İ., & Yılmaz, A. (1999). Duties and qualifications of science teachers, recommendations for training science teachers. *Hacettepe University Journal of the Faculty of Education, 15,* 181–186.

Ortaş, İ. (2002). Science, scientists, scientific ethics. *University and Society, 2*(2). Retrieved 08.07.2014 from http://www.universite-toplum.org/text.php3?id=76

Özoğlu, Ç. S. (1994, December). *Science and educational relations.* Paper presented at the Scientific Meeting of the Academy of Sciences of Turkey Series, TÜBA, Ankara, Turkey.

Öztas, T. (2008). The teaching of history and movies. *Kastamonu Journal of the Faculty of Education, 16*(2), 543–556.

Phillips, R. (2002). *Reflective teaching of history 11-18.* London, UK: Continuum.

Polsani, P. R. (2003). Use and a buse of reusable learning objects. *Journal of Digital Information, 3*(4), 76–84.

Punch, F. K. (2005). *Introduction to social research quantitative and qualitative approaches* (trans. D. Bayrak, H. B. Arslan, & Z. Akyüz). Ankara, Turkey: Siyasal Bookstore.

Roberts, L. C., Dean, E., & Nienhuis, T. (2003). Lights, camera, action: Teaching with feature film in the social sciences. *MountainRise, 1*(1). Retrieved from http://mountainrise.wcu.edu/issue.html

Robertson, J. P. (1995). Screenplay pedagogy and the interpretation of unexamined knowledge in pre-service primary teaching: Taboo. *The Journal of Culture and Education, 1*, 25–60.

Seferoğlu, S. S. (2006). *Öğretim teknolojileri ve materyal tasarımı [Instructional technology and material design].* Ankara, Turkey: Pegem Academy Publication.

South, J. B., & Monson, D. W. (2000). *A university-wide system for creating, capturing, and delivering learning objects*. Retrieved 05.07.2014 from http://www.reusability.org/read/chapters/south.doc

Sweeney, A. E. (2003). Articulating the relationships between theory and practice in science teaching: A model for teacher professional development. *Teachers and Teaching, 9*(2), 107–132.

Şahin, T. Y., & Yıldırım, S. (1999). *Öğretim teknolojileri ve materyal geliştirme [Instructional technology and material development].* Ankara, Turkey: Anı Publication.

Taylor, A. R., Jones, M. G., Broadwell, B., & Oppewal, T. (2008). Creativity, inquiry, or accountability? Scientists' and teachers' perceptions of science education. *Science Education, 92*(6), 1058–1075.

Wayne, A. J. (2008). Experimenting with teacher professional development: Motives and methods. *Educational Researcher, 37*(8), 469–479.

Wenger, R. (1943). Motion pictures in teacher education. *Educational Research Bulletin, 22*(4), 90–96.

Whiteman, D. (2009). Documentary film as policy analysis: The impact of yes, in my backyard on activists, agendas, and policy. *Mass Communication and Society, 12*(4), 457–477.

Wiley, D. A. (2002). *Connecting learning objects to instructional design theory: A definition, a metaphor, and a taxonomy*. Retrieved 16.06.2014 from http://www.reusability.org/read/chapters/wiley.doc

Yıldırım, A., & Şimşek, H. (2008). *Sosyal bilimlerde nitel araştırma yöntemleri [Qualitative research methods in the social sciences].* Ankara, Turkey: Seçkin Publication.