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Full Length Research Paper

The impact of English language proficiency testing on the pronunciation performance of undergraduates in South-West, Nigeria

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This study investigated the impact of English Language proficiency testing on the pronunciation performance of undergraduates in South-west. Nigeria. The study was a descriptive survey research design. The target population size was 1243 (200-level) undergraduates drawn from eight tertiary institutions. The instruments used for data collection were the English Language Proficiency Test and Pronunciation Test. The English Language proficiency test was used to measure the performance of students in English Language and was adopted from the Post-UTME past questions from Babcock University Admissions Office on Post Unified Tertiary Admissions and Matriculation Examinations screening exercise (Post-UTME) for undergraduates in English and Linguistics. The test contains 20 objective English questions with optional answers. The instruments were validated through experts' advice as the items in the instrument are considered appropriate in terms of subject content and instructional objectives while Cronbach alpha technique was used to estimate the reliability coefficient of the English Proficiency test, a value of 0.883 was obtained. The research questions were answered with mean and standard deviation while hypothesis was tested with Pearson Product Moment Correlation Coefficient at 0.05 alpha level. The findings of the study revealed that the mean value of the students' English Proficiency and pronunciation scores were 66.36 and 74.21% respectively, which showed that the students' English proficiency and pronunciation performance were above average and high result respectively; there was a significant positive relationship between proficiency in English Language and pronunciation performance of the students who participated in the study ($r = 0.589$; $p < 0.05$).

Key words: English proficiency test, pronunciation, Language Testing, University, South-West.

INTRODUCTION

Language is the major tool of communication in our society and speech serves as a communication medium

in which discussion of language is possible. In their submission, Obisike et al. (2019) regard language as the human existence trademark in which communication of humans and their relationship with one another is made possible. Nwala and Obisike (2014) opined that language is produced by speech for communication through a logical and consistence system. Santos (2019) explained that among the characteristics of man is the ability to send messages about events, situations and objects through language. The difference between man and animals is speech, man uses speech sounds for communication and English Language cannot be used very well without the effective manipulation of the speech sounds as far as for competence in linguistics is concerned. According to Kolawole and Oyinloye (2008), the most studied and generally desired language in the world is English Language, especially in the Nigerian society, starting from the nursery school to post-secondary school. It is a verbal behaviour governed by rules that have attained international scope (Omale, 2019). The importance of English Language in Nigeria cannot be over-emphasised. Apart from the fact that it is the language used for instruction, it builds bridge across the barriers created by the existence of several ethnic groups and also serves as the official language with which communication is done in all facets of political, economic and social lives.

In their submission, Jackobson and Halle (2016) averred that for language users to achieve an effective communication, then the morphological, syntactical, semantic and phonological ideals of the language must be maintained, otherwise, the language will not be properly communicated which also affect the language proficiency of the user. Oral communication is an avenue whereby the sounds of language are being put in so as to yield precise lexical items which results to acceptable syntactic structures due to its important to create effective communication between the speaker and the hearer, more so as an average of 70% of a normal person's working day is engaged in oral communication, invariably, man speaks more than he writes (Oyinloye, 2013; Fasanmi, 2006). English pronunciation is an important subject since it provides the students with the required knowledge to fully comprehend and communicate in this language. By knowing the correct English pronunciation, the students are able to avoid misunderstanding in the language. Emphasizing the importance of pronunciation, Pourhosein (2016) explained that to pronounce is to make a meaningful sound. In the teaching and learning of pronunciation, its target is more than merely telling the learners to pronounce like the native speakers but emphasizes should be placed on pronouncing effectively. For effective pronunciation by the learners, learners should alter the way they think about the sounds of words and parts of speech such as stress pattern, rhythm and syllables.

Correct pronunciation aids learners to achieve their goals in communication that is their vocal sounds can be perceived by the audience clearly and easily and they will also be able to understand native speakers' conversations. But achieving accuracy in pronunciation does not come stress-free for the learners neither do teaching pronunciation for the teachers. Egwuogu (2012) explained that to speak is to orally encode information before conveying the information to the listener and the listener must be knowledgeable enough in the sounds of the language so as to underatand and decode the information which was passed across to him/ her. This shows that the encoder and the decoder must be knowledgeable in the pronunciation of sounds, formation of words, construction of sentences as well as the interpretation of meaning in that language. Therefore, teachers of ESL should primarily pay particular attention to teaching the core language features which are allowed by the national and international, and also be understood by even the native speakers of the Target Language (TL).

Testing is an approach to measure and ascertain the ability level of the testee or the student in a given domain. According to Kemilainen (2018), testing is the measure a testee's proficiency or knowledge through a test. A test is an instrument or procedure designed to find out the level of achievement from learners on a set out goals. There are four rationales for administering a test which are to show prospect ability; to find out what is already known; to locate what has been learnt; and to recognize what is still to be learnt. Language testing is a process whereby test is administered so as to assess and estimate a person's language competence and performance in language. In his view, Allen (2019), sees language testing as the drill to ascertain the proficiency of an individual in using a particular language effectively. Brown (2010) asserted that the skills that should be tested for language proficiency are listening, speaking, reading and writing skills. During the Language testing, the learners' difficulties and L2 proficiency must be diagnosed and assessed respectively.

Brown (2010) also stated the different test that are in common use in language curricula are: (a) Proficiency tests: Proficiency tests have traditionally consisted of standardised multiple choice items on grammar, vocabulary, reading comprehension, aural comprehension, and sometimes a sample of writing. (b) Diagnostic tests: Diagnostic test is used to diagnose a particular aspect of a language. It is used to determine the phonological features which are difficult for a learner. Diagnostic tests are used to find out the strengths and weaknesses of language learners; (c) Placement tests: A placement test is used to assign a student into a suitable level or position of a language curriculum or school; (d) Achievement tests: An achievement test is used to achieve the course objectives at the end of a particular instruction; (e) Aptitude tests: An aptitude test is a test that forecasts a person's future success. A language aptitude test is designed to measure a person's potential

to learn a foreign language. Researchers such as Parlindungan (2018), Cook (2008) and Thompson et al. (2001) asserted that the teachers can use 44 phonetic symbols as a guide to teach pronunciations to students; sounds can be used to differentiate between the target language and the learners' mother tongues; use of dialogues or mini-conversations; use of tutorial session and self-study technique, recording of the learners' speech and contrasting it with native model; use of Computer-Assisted Language Learning (CALL) (Jolayemi and Oyinloye, 2019); imitating teachers by the students; self-monitoring; and reading aloud.

Kang (2013) in his study, found that the effect of the pronunciation features on ratings of non-native speakers' (NNS) oral proficiency was arranged in order of rank. Navidinia et al. (2019) used experimental approach to find the effect of discerning on English as a Foreign Language (EFL) students' speaking accuracy and revealed a positive effect on EFL students' speaking accuracy. Khoshsima et al. (2018) found that there is a positive effect of teaching test-taking strategies on Iranian IELTS candidates' performance on the reading section. They also took the perceptions of the experimental group participants regarding the teaching test-taking strategies and found the same positive attitudes. Sukyadi and Mardiani (2011) found that English National Examination (ENE) had mentionable impacts on teachers and students. This study found that the ENE also affected the students' learning in the classroom in which teachers made the students practise the test and enhance their test-taking skills. Sukyadi and Mardiani (2011) found that the washback effect occurred only when the students and teachers felt that the ENE preparation is an obligation.

One of the challenges faced by teachers is pronunciation assessment, and despite the fact that pronunciation is an important unit of proficiency in spoken English, there are few published works in the concerned area. Therefore, this paper seeks to find out the impact of language testing (example, English Language proficiency test) on the pronunciation performance of undergraduates' students of Linguistics in South-west geopolitical zone of Nigeria.

Research questions

The following research questions were formulated to guide the study:

1. What is the level of English proficiency of Linguistics undergraduate students in the South-west geopolitical zone of Nigeria?
2. What is the performance level of the participants in pronunciation of English words?
3. Is there a relationship between the level of English Language proficiency possessed and Linguistics students' performance in pronunciation?

Hypothesis

The following hypothesis was tested at 0.05 alpha level of significance:

1. There is no significant relationship between the level of English Language proficiency possessed and Linguistics students' performance in pronunciation.

Theoretical frame work

Proficiency in language and communicative competence

Proficiency in language is fundamentally viewed as the ability to make utilize language in communicative situations. Mäkelä (2005) opined that communicative competence has been the target of foreign language teaching since the early 1970s. Chomsky (1965) gave an introduction to the term, competence. He differentiated between performance and competence, whereby performance is a situation where a speaker uses language in real life situations, and competence is where the speaker is conscious of the language and its structure. The Chomsky's ideas was further developed by Hymes (1972) further whereby he explained that communicative competence grammatical knowledge of language and the ability to use the language in social interactions. Chomsky's and Hyme's models which dealt in first language teaching later became a vital action that helped to make progress towards other frameworks. Canale and Swain later developed a model for second language teaching and testing purposes in 1980 in which the model influenced the comprehension of communicative competence. The model of Canale and Swain (1980) divided communicative competence into three diverse competences such as sociolinguistics competence, strategic grammatical competence and grammatical competence. Bachman and Palmer (1996) also enlarged the Canale and Swain's model of communicative competence for testing by including more detailed information about personal and test-related characteristics that affect an individual's test performance.

This study made use of the model presented in language proficiency and communicative competence. This study investigated the impact of English proficiency test scores of undergraduate students on their pronunciation performance. The English proficiency test was made up of items on grammatical knowledge of English Language, vocabulary, morphology, syntax and semantics etc. This is to find out the grammatical competence or skills which the participants possess. The pronunciation test comprised of an English reading comprehension passage so as to test the pronunciation performance of the participants. Moreover, the

Table 1. Level of English proficiency of Linguistics undergraduates in the South-West geopolitical zone of Nigeria.

S/N	Name of University	Mean	Standard deviation
1	Federal University, Oye-Ekiti	71.02	26.99
2	University of Ibadan, Ibadan	71.48	26.95
3	Obafemi Awolowo University, Ile-Ife	73.23	24.40
4	Ekiti State University, Ado-Ekiti	51.81	9.48
5	Osun State University, Osogbo	70.48	27.21
6	Adekunle Ajasin University, AkungbaAkoko	66.26	24.87
7	Olabisi Onabanjo University, Ago-Iwoye	74.40	24.01
8	Fountain University, Osogbo	52.18	9.57
	Grand Mean	66.36	21.69

pronunciation test (reading comprehension tests) was used to ascertain the students' ability to differentiate the difference between letters and identify relationships between sounds of letters. letters; ability to acknowledge words and group of words; ability to relate sounds with their matching graphic symbols and comprehend their various meanings; concede structural clues and understand the criterions of the structures; put a name to the meaning of a sentence and any complete sequence of words; discern the connections and series of ideas; apprehend paragraphs and longer units of novels and select the main idea and other characteristics; grasp and peruse for particular information; and scrutinize in a way that expresses or involves an analysis of the merits and faults of a work.

METHODOLOGY

In this study, descriptive survey research design was used. This study made use of the 200 level undergraduates in South-west geopolitical zone of Nigeria. Five states: Ekiti, Ondo, Osun, Oyo and Ogun States were randomly selected for the study. The sample population size was 1243 (200-level) undergraduates drawn from eight universities which are: Federal University, Oye-Ekiti; Ekiti State; University of Ibadan, Ibadan, Oyo State; Obafemi Awolowo University Ile-Ife, Osun State; Ekiti State University, Ado-Ekiti, Ekiti State; Osun State University, Osogbo, Osun State; Adekunle Ajasin University, Akungba-Akoko, Ondo State; Olabisi Onabanjo University, Ago-Iwoye, Ogun State; and Fountain University, Osogbo, Osun State. The selected universities are made up of three federal universities, four state universities and one private university.

English Language Proficiency and Pronunciation tests were the instrument used in data collection. The English Language proficiency test was used to find out the performance of students in English Language and was adopted from the English and Linguistics Post-UTME past questions from Babcock University Admissions Office. The test contained 20 objective English questions which has options lettered A to D. The students were given 30 minutes to write the proficiency test. The pronunciation test involved a reading passage which the participants were made to read aloud while the researchers recorded their performances on how the students pronounced words in the passage. The English Language Proficiency and Pronunciation tests were graded on 100% each. The instruments were subjected to face validity as well as content validity through three (3) experts in Languages and

Literary Studies Department and, Education Department, Babcock University. The items are considered appropriate in terms of subject contents and instructional objectives. Cronbach alpha technique was employed to estimate the reliability coefficient of the English Proficiency test and a value of 0.883 was obtained. The data collected were analysed using mean and standard deviation while the hypothesis was tested with Pearson Product Moment Correlation Coefficient at 0.05 alpha level.

RESULTS

Research question one

What is the level of English proficiency of Linguistics undergraduate students in the South-west geopolitical zone of Nigeria?

Table 1 presents the level of English proficiency of Linguistic undergraduate students in the South west geopolitical zones of Nigeria.

Table 1 shows the mean scores and standard deviation of the English proficiency possessed by the participants in terms of their respective universities. Olabisi Onabanjo University, Ago-Iwoye has the highest mean score of 74.40 in English proficiency test, followed by Obafemi Awolowo University, Ile-Ife with mean of 74.23; followed by University of Ibadan, Ibadan with mean of 71.48; followed by Federal University, Oye-Ekiti with mean of 71.02; followed by Osun State University, Osogbo with mean of 70.48; followed by Adekunle Ajasin University, Akungba-Akoko with a mean of 66.26; followed by Fountain University, Osogbo, with mean of 52.18; followed by Ekiti State University, Ado-Ekiti with a mean of 51.81. Table 1 also shows a grand mean of 66.36 which is above the critical mean of 50. This means that the level of English proficiency which the undergraduate students in South-west geopolitical zone possess is above average.

Research question two

What is the performance level of the participants in pronunciation? Table 2 introduces us to the performance

Table 2. Performance level of participant in pronunciation.

S/N	Name of University	Mean	Standard deviation
1	Federal University, Oye-Ekiti	86.19	10.24
2	University of Ibadan, Ibadan	86.22	10.37
3	Obafemi Awolowo University, Ile-Ife	73.6	24.36
4	Ekiti State University, Ado-Ekiti	54.15	21.25
5	Osun State University, Osogbo	71.48	26.95
6	Adekunle Ajasin University, Akungba-Akoko,	73.04	24.51
7	Olabisi Onabanjo University, Ago-Iwoye	82.7	20.24
8	Fountain University, Osogbo	66.26	24.87
	Grand Mean	**74.21**	**20.35**

Table 3. Relationship between the level of English language proficiency possessed and linguistics students' performance in pronunciation.

Variable	N	r	Sig. (2-tailed)
English Language Proficiency Test			
Pronunciation Test	1,243	0.589	0.001

$\alpha = 0.05$.

level of the participants in pronunciation.

Table 2 shows the participants' performance level of pronunciation in terms of their various universities. University of Ibadan, Ibadan, Oyo State has the highest mean score of 86.22 in pronunciation test, followed by Federal University, Oye-Ekiti, Ekiti State with a mean of 86.19; followed by Olabisi Olabanjo University, Ago-Iwoye, Ogun State with a mean of 82.7; followed by Obafemi Awolowo University, Ile-Ife, Osun State with mean of 73.6; followed by Adekunle Ajasin University, Akungba-Akoko, Ondo State with mean of 73.04; followed by Osun State University, Osogbo, Osun State with a mean of 71.48; followed by Fountain University, Osogbo, Osun State with a mean of 66.26; followed by Ekiti State University, Ado-Ekiti, Ekiti State with a mean of 54.15. Table 2 also shows a grand mean of 74.21 which is above the critical mean of 50. This means that the participants' performance level of pronunciation is high.

Hypothesis one

There is no significant relationship between the level of English Language proficiency possessed and Linguistics students' performance in pronunciation.

Table 3 shows the relationship between the level of English Language proficiency possessed and Linguistics students' performance in pronunciation. Table 3 shows a positive correlation coefficient of 0.589, and a p-value of 0.001. Testing the hypothesis at the 0.05, the p-value is less than the alpha value of 0.05. This means a significant relationship and the hypothesis is, therefore, rejected. Therefore, there is a significant relationship between the level of English Language proficiency possessed and the Linguistics students' performance in pronunciation. The positive relationship implied that the more proficient students are in English, the better their performance in pronunciation.

DISCUSSION

Research question one revealed that the level of English proficiency which the undergraduate students in South-west geopolitical zone possess is above average. The finding of this study is in disagreement with the finding of Alghazo (2015) who revealed that the mean for students' proficiency level of students used in the study was 2.39% which shows that they are just under the intermediate level of proficiency.

Research question two revealed that the participants' performance level of pronunciation is high. The finding of this study is not in agreement with the finding of Ubong et al. (2012) who found that 6.2% of the respondents appropriately pronounced and the performance in all other items are all below 50%.

Result from hypothesis one revealed that there is a significant relationship between the level of English Language proficiency possessed and Linguistics students' performance in pronunciation. The finding of this study is in line with the finding of Khoshsima et al. 2018) who found that the use of test-taking approaches had positive effects on Iranian IELTS candidates'

performance on the reading section. To the contrary, the study of Matemilola (2004) revealed that language teaching and testing in Nigeria may not bring about the growth of communicative competence in learners.

Conclusion

Based on the findings of this study, it is concluded that the English Language proficiency and pronunciation levels of the participants in this study is above average and high respectively; and there is a positive significant relationship between the level of English Language proficiency possessed and Linguistics students' performance in pronunciation. This means that the more the students are proficient in English Language, the more their performance in pronunciation will improve.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Analysis of distance education activities conducted during COVID-19 pandemic

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It could be suggested that the covid-19 pandemic, which initially emerged in China and then affected the whole world, negatively affected several aspects of life since it halted life globally. One of these aspects is education. Education that usually takes place in various learning environments at schools had to be conducted from a distance after the pandemic. This requirement imposed certain responsibilities on students, teachers and parents, who are among the most important variables in education, and also led to problems in educational activities. Due to these developments, the present study aimed to analyze the educational activities conducted in Turkey during the pandemic. The analyses were conducted on the views of the participating teachers assigned with the purposive sampling method. The main objective of this work done is to analyze the outbreak of Covid-19 process and the remote training activities regarding teachers in Turkey. In the present qualitative study, the data collected with a semi-structured interview form developed by the authors are presented in the findings section based on the sub-themes analyzed with content analysis. The current study findings revealed that the teachers of various disciplines who were included in the study group stated remarkable views on the education conducted during the covid-19 pandemic. Recommendations are also presented based on the study findings.

Key words: Covid-19, pandemic, distance education, teacher, view.

INTRODUCTION

A review of the human life pyramid, which is one of the variables with the highest impact on the change and transformation of globalization, would demonstrate that humankind experienced several epidemics and pandemics caused by different pathogens in history. Examples of these epidemics include Black Plague, Cholera, Yellow Fever, Smallpox, Hong Kong Flu, SARS, MERS, Spanish Flu and Ebola. The common feature of these epidemic diseases, which could easily turn into a pandemic and have high mortality rates, is that these diseases are all induced by zoonotic pathogens that are transmitted by animals to humans (Koçer, 2020). The term zoonosis was first introduced in the 19th century. It could be suggested that with the introduction of the term by Rudolf Virchow, the health correlation between animals and humans became a prominent research topic

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(CDC, 2017).

In addition to the above-mentioned diseases, COVID - 19 was the last disease that has been effective on the world since December 2019 and was declared as a pandemic by World Health Organization). COVID-19 disease is claimed to have originated at Huanan Seafood and Live Animal Market, which is a livestock market in Wuhan, China, in December 2019 (Tesini, 2020; Üstün and Özçiftçi, 2020). Despite the fact that the origin of the pathogen virus, which immediately became an epidemic, was not objectively determined by the scientific community, several people claimed – albeit non evidence – that the disease was caused by contact with the animals sold in the above-mentioned market and their consumption. This virus (2019-nCoV) was first diagnosed in Hubei province in China in late 2019 in a group of patients with pnömoni, by a professional team of physicians, scientists and epidemiologists in about 9 days as a coronavirus that has not previously been detected in humans. The disease was christened as "COVID-19" (Akpınar and Üstün, 2020).

According to the data published in the official WHO website as of May 26, 2020, the number of global covid-19 cases was 5.404.512, while the number of people who died from the disease was 343.514 (WHO, 2020). Due to the case and death incidence of the COVID-19 epidemic, which has been increasing globally every day, it was considered as a pandemic, and several countries closed their borders to the outside world and quarantined their nation. Since these decisions were based on isolation, they led to panic and anxiety around the world, and to support the "stay at home" calls, countries temporarily interrupted formal education activities in several fields, and turned to the distance education method. It was observed that the student population, which has been away from school in more than 188 countries affected by the pandemic, corresponded to 91% of the total global student population (UNESCO, 2020; Emin, 2020).

The distance education activities were adopted to maintain educational activities in countries that were affected by the epidemic by the transfer of the course content and relevant materials to the digital environment. The term "distance education (DE)" was coined in the 1892 University of Wisconsin Catalog, and first mentioned in an article authored in 1906 by the administrator of the same university, William Lighty (Kaya, 2002). Later on, the term was adapted to German (Fernunterricht) by educator Otto Peters in the 1960s and 1970s and to French (Teleenseignement) by distance education institutions in France (Verduin and Clark, 1994; Kaya, 2002).

The United States Distance Learning Association (USDLA, 2004) defined distance education as access to education using tools such as satellite, audiovisual, graphical, computerized, and multimedia, etc. technologies. Distance education includes activities such as multimedia-based education, interactive learning-instruction and guidance, keyboard control, e-learning independent of time and space, interactive classroom management, digital transfer and exams (Guo, 2010; Guohong et al., 2012). It could be suggested that distance learning has several advantages over traditional classroom education. These advantages include the utilization and sharing of several resources at the same time, interactive collaborative sharing and interaction in the learning-teaching process (Guo, 2010). There are several application examples in the world and digital educational activities take place in several forms. A National Distance Education University was established in Spain to conduct these activities. Similarly, distance education courses (Coursera, EDX, Udacity, Open Yale Courses, Teamtreehouse, etc.) were organized by several educational platforms globally (Samigulina and Samigulina, 2016).

Today, educational knowledge and instruction methods are very important indicators of social development (Collins et al., 2016). It could be suggested that societies who are aware of these indicators tended to conduct instructions on web-based digital environments during the Covid-19 outbreak. In the present study conducted to comprehensively analyze this trend, the views of teachers, who are among the important variables in distance education, were employed.

Aim of the study

The aim of the present study was to analyze the educational activities conducted during the Covid-19 pandemic based on the views of teachers across Turkey. Thus, the following research questions were determined:

(i) In your opinion, what are the most important characteristics of distance education adopted during the pandemic?
(ii) What are your criticism and recommendations about the instruction of the courses instructed with distance education during the pandemic?
(iii) Do you think the resources and material used in the courses instructed with distance education during the pandemic are adequate, why?
(iv) What should be done to improve the efficiency of the distance education system adopted during the pandemic?

METHODOLOGY

The present study aimed to determine teacher views on distance education activities conducted during the Covid-19 pandemic in Turkey is a qualitative study. The methodological stages of the present study are presented in Figure 1.

Research design

The present study aimed to determine teacher views on distance
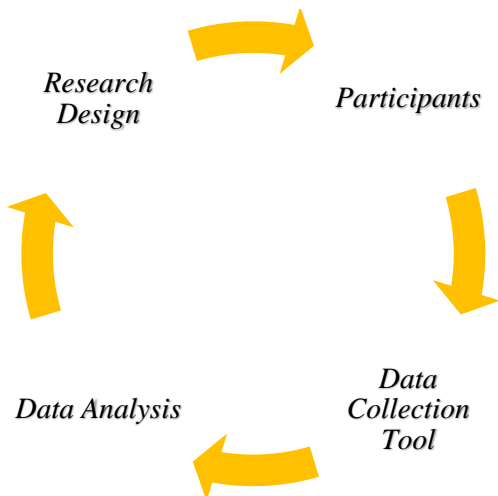
Figure 1. The study methodology.
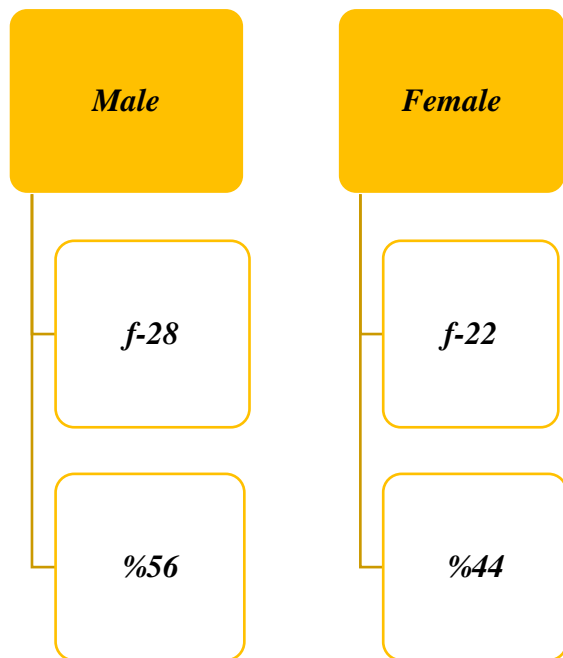
Figure 2. The distribution of the participants based on gender.

Figure 3. The distribution of participant disciplines.

education activities conducted during the Covid-19 pandemic in Turkey was designed with the phenomenology research design. The phenomenology design focuses on cases that we are aware of but do not have an in-depth and detailed understanding of. Facts could be in various forms such as events, perceptions, trends, concepts and situations. Phenomenology is an adequate basis for research on topics that are not entirely unknown but could not be fully grasped (Yıldırım and Şimşek, 2011; Göçer, 2013). In this model, the researcher is interested in the subjective experiences of the participants and examines the perceptions of the individuals and the meanings they assign to the events. Phenomenology is a descriptive research method. Thus, the method aims to describe the facts and not to generalize (Göçer, 2013).

Participants

In the present study that aimed to determine teacher views on distance education activities conducted during the Covid-19 pandemic in Turkey, the participants were assigned with purposive sampling method. The selection criterion was employment in public schools in different provinces in Turkey. The participating teachers were selected from different locations to collect study data that could represent the whole Turkey. Fifty teachers who were employed in various public schools in Turkey were selected. The participant demographics are presented in Figures 2 and 3.

As seen in Figure 2, the majority of the teachers who in the study group were males. This could be explained by the voluntary participation principle in the study. The review of Figure 3 where the distribution of participating teacher disciplines demonstrated that the disciplines of the teachers who supported the study with their views included six disciplines that covered primary, middle and high schools in Turkey.

Data collection instrument

The data for the analysis of distance education activities during the Covid-19 pandemic were collected by obtaining the views of teachers employed in various schools in Turkey. A semi-structured interview form developed by the authors was used to collect teacher views. The semi-structured interview form was developed by determining the questions based on the aim of the study. The principles adopted when determining the questions included the development of easy to comprehend questions, open-ended questions, focused questions, avoidance of guidance, multi-dimensional questions, and logical organization of the questions (Yıldırım and Şimşek, 2011; Koçoğlu and Egüz, 2019). The developed interview was submitted to measurement and evaluation specialists employed in Inonu University in Turkey to ensure the

Table 1. The views of participating teachers on the features of distance education.

Theme: Important Features of Distance Education		
Sub-Themes	**f**	**%**
G.1. Accessibility and flexibility	13	26
G.2.Popularity and resource sharing	7	14
G.3.Interaktive software infrastructure	12	24
G.4.Availability of live classroom education	10	20
G.5.Access to virtual resources	8	16
Total	50	100

content validity of the interview form. The semi-structured interview form was finalized based on the expert views and suggestions. The final form included 4 questions. All questions in the semi-structured interview form were provided in writing to the participants in an interactive environment and the participants answered the questions also in writing, which were then collected and analyzed by the authors.

Data analysis

In the study, after the views of the participant teachers in the study group were collected with the semi-structured interview form, the responses were grouped under certain themes with the content analysis technique. The semi-structured interview forms were analyzed qualitatively. Data were analyzed by computer. The findings obtained with data analysis and the developed sub-themes are presented with computer-generated figures. Sub-themes were determined by the authors based on the similar study group participant responses to the questions in the semi-structured interview form. To ensure the data reliability, expert opinions were obtained. The sub-themes associated with the main themes in the study were developed based on the recommendations of the experts. In the study, the responses from the participating teachers were given to the experts whose opinions and suggestions were used in the study, and the findings were asked to be themed with the content analysis technique. By comparing the sub-themes obtained by the experts and those reached by the researchers, the themes that constitute the study findings were reached. The themes that were determined based on the analyses were classified and visualized to demonstrate the correlations. The number of participants (frequency) that stated the theme that reflected the correlations determined during the classification, the percentage of these participants, and similar views were grouped as G.1, G.2, and G.3, presented in the tables in the findings section. Furthermore, selected direct participant quotes were also presented.

FINDINGS

The important features of distance education

In the study, the responses of the participants to the question "In your opinion, what are the most important characteristics of distance education adopted during the pandemic?" included in the semi-structured interview form were analyzed with content analysis method and the findings are presented in Table 1.

As seen in Table 1, the contributing teachers had various and remarkable views. The findings on the participating teacher views, similar to most countries in the world, on the features of distance education adopted during the pandemic are presented in Table 1 as 5 sub-themes. Although each sub-theme was important since it included different evaluations and generalizations, it was observed that the most frequent sub-theme in the study was "accessibility and flexibility". This could be due to the fact that this type of education was popularized in Turkey, similar to other nations, and anyone who desires to utilize distance education could benefit from it to improve their knowledge in any field. A sample of participating teacher views based on the findings detailed in Table 1 is presented below:

"I only knew about the distance education concept by name. After the Covid-19 pandemic, I was alienated with the regular instruction in formal education. So, as you can understand, due to necessity, distance education became the center of our lives. Thus, I can answer the question you ask by stating the availability of this form of education at different times and locations" (Participant 3).

"I was not unfamiliar to distance education due to my discipline. I am also one of the advocates of the thesis that distance education allows to train students who are really aware of their requirements. I do not think that the current implementation of distance learning is efficient since it is imperative. The most important feature of this education method is the easy access of the student to several web-based resources at the same time" (Participant 17).

Distance education instruction methods implemented during the pandemic

In the study, the responses of the participants to the question "What are your criticism and recommendations about the instruction of the courses instructed with distance education during the pandemic?" included in the semi-structured interview form analyzed and classified under sub-themes, and the findings are presented in

Table 2. The views of participating teachers on distance education instruction methods.

Theme: Distance Education Instruction Methods			
Sub-Themes			
Criticism	**Recommendations**	**f**	**%**
G.1. Slide-based presentation	Participation-based discussion	10	20
G.2.Classical instruction	Student-oriented instruction	12	24
G.3.Teacher-oriented question and answer	Student-oriented/teacher-supervised question and answer	15	30
G.4.Learning by observation	Learning by doing and living with sample cases	5	10
G.5.Stationary content-based instruction	Technology-assisted content instruction	8	16
Total		50	100

Table 2. The analysis of the findings presented in Table 2 suggested that the participant teachers stated similar views in four sub-themes. It could be suggested that they ideated significant criticism and recommendations. Based on these suggestions and criticism, the most frequent views in the criticism sub-theme were about teacher-oriented question-answer instruction and the most frequent recommendation was student- oriented/teacher-supervised question and answer instruction. A sample of participating teacher views based on the findings detailed in Table 2 is presented below:

"During the Covid-19 pandemic, I do not think that the distance education provided in our country was qualified; since the education unfortunately is instructed in our country with teacher-oriented instruction method, which is a traditional approach. The student watches almost like a robot. Instead of this type of instruction, I think that it should involve the student in the process, guide the students through activities and allow them to acquire a sense of responsibility" (Participant 23).
"As a teacher and a father, I can easily say the following: I do not believe that students understand a topic, a content, a case or an event by following it. Independent of the type of education. I think the same is true for distance education. Instead, I think that planning activities on the preparation and repetition of the topic and sharing them with their peers in an interactive environment would increase their learning levels" (Participant 10).

The resources and material employed in distance education during the pandemic

In the study, the responses of the participants to the question "Do you think the resources and material used in the courses instructed with distance education during the pandemic are adequate, why?" included in the semi-structured interview form were analyzed and the findings are presented in Table 3.

   Here, where the resources and material employed in distance education implemented in Turkey during the pandemic were analyzed based on teacher views with

content analysis, six sub-themes were identified and are presented in Table 3. It was observed that three of these themes were in the category of "yes" and the other three were in the category of "no". The different approaches of the participant teachers to the topic could be suggested as the reason for this. A sample of participating teacher views based on the findings detailed in Table 3:

 "I can say that we spent almost the entire spring term conducting distance education. However, in this process, it was the Ministry of National Education that was more active than us teachers; because, I can say that education was coordinated by the ministry. I do not find the resources and materials used in a distance education process where coordination was conducted by a single center and with only a few resources" (Participant 49).
"During the pandemic, we have been conducting the educational activities with distance education and interactively. First of all, I would like to congratulate our Minister of National Education for allowing fast adaptation to the process and providing necessary infrastructure for the students and parents at home. This process may entail certain problems since it as an obligation. However, I am positive about the question you asked on the subject. In this process, I find the utilized resources and material sufficient since the supervision and evaluation of the students by the teachers were not sufficient" (Participant 35).

The measures that could be adopted to improve the effectiveness of distance education

In the study, the responses of the participants to the question "What should be done to improve the efficiency of the distance education system adopted during the pandemic?" included in the semi-structured interview form were analyzed and the findings are presented in Table 4. In Table 4, it could be observed that the participating teachers developed several recommendations.

   The review of Table 4, where the findings about the responses of participating teachers in the final question

Table 3. The views of participating teachers on resources and material employed in distance education.

Theme: The resources and material employed in distance education			
Sub-themes		**f**	**%**
Yes	G.1. Inability to evaluate and monitor	7	14
	G.2. MNE based and controlled	5	10
	G.3. Inability to instruct the course based on resources	10	20
No	G.4. Obligation tu use a single resource and material	10	20
	G.5. Avoidance of interactive material	8	16
	G.6.Passive-avoider teacher traits	10	20
Total		50	100

Table 4. The views of participating teachers on the improvement of the effectiveness of distance education.

Theme: The improvement of the effectiveness of distance education		
Sub-Themes	**f**	**%**
G.1. Improvement of parent participation through teacher-parent communications	5	10
G.2.Internet and technological material support	7	14
G.3.Monitoring the student participation in education	5	10
G.4.Conducting online exams in different intervals	6	12
G.5.Informative instruction on distance education	4	8
G.6.Rich content support to motivate students	5	10
G.7.Temporal freedom in participation to education	3	6
G.8.Development of face-to-face education platforms	4	8
G.9.Learing interaction	6	12
G.10.Development of advanced software	5	10
Total	50	100

on semi-structured interview form were presented, revealed that the responses were diverse and remarkable. It was observed that the frequencies of various responses were similar. However, the analysis the study findings presented in Table 4 demonstrated that small groups of participant views differed in many aspects. This difference could be due to the fact that they developed several suggestions on the topic. A sample of participating teacher views based on the findings detailed in Table 4:

"In my opinion, the process requires consultation. In other words, it requires teacher-parent interaction; because, the student is far away from the supervision and control of the teacher in this process and may not take some activities seriously. However, I think that these student problems are caused by the course teacher and the parents. Therefore, the distance education process should be first taken seriously by teachers and parents, and students should be supported when accessing distance education systems. Distance education should not be left to the discretion of the students, but parents

should organize and supervise the process" (Participant 25).

"Although I have several complaints about this distance education process adopted due to the Covid-19 pandemic, I would like to make a single suggestion. Since, if this proposal will not be implemented, I think that this education could not be provided. My suggestion is to provide the student with free internet and material (computer, tablet, etc.) support for distance education" (Participant 12).

DISCUSSION

Before the conclusion of the study, it could be stated that distance education activities became popular in scientific circles in several countries around the world due to the Covid-19 pandemic (Joswey et al., 2020). The present study was conducted to query several features of this education method due to the popularity of distance education during the pandemic. Thus, in the present study that aimed to analyze distance education

conducted in Turkey during Covidi-19 pandemic based on the views of participating teachers, it was observed that different and remarkable findings were observed (Tables 1 to 4). The study findings were presented as sub-themes under the four themes determined with content analysis. These themes were important features of distance education, the distance education instruction methods adopted during the pandemic, resources-materials used in distance education, and the requirements to improve the effectiveness of distance education.

Among the important study findings were those in the important features of distance education sub-theme. The review of these findings presented in Table 1 revealed that the features of distance education such as accessibility, flexibility, popularity and live classroom instruction were mentioned. This finding was consistent with the reports by Elliot and Miller (1999), Kurbel (2001), Mcluhan (2001), Doyle (2001), Kör et al. (2013) and Kantek (2014) in different periods.

In the present study that aimed to analyze distance education in Turkey during the Covid-19 pandemic, it was observed that significant results were obtained on the instruction of distance education during the pandemic (Table 2). These findings revealed that the participants mentioned both critical views and recommendations about the distance education process in Turkey. It could be suggested that the main theme of the criticisms emphasized by the participating teachers was the uniform content and teacher-oriented traditional instruction. In response to these criticisms, they also proposed suggestions that included student-oriented instruction. This study finding underlined the prominent generalization that "independent of the education system, the student should be put at the center to improve the level of meaningful learning in all systems." It could be suggested that this study finding was consistent with the findings reported by Çalışkan (2002) and Demirci (2003). One of the significant study findings was the competency of the resources and material utilized in distance education. In the study, it was determined that most participating teachers (f-28) had a negative view about competency. It was observed that the teachers justified this in the sub-themes such as non-sociable and non-creative traits of the teachers, their inability to use interactive resources, and using similar resources in the whole education field (Table 3). On the contrary, the participants who found the materials adequate stated that the levels of resource and material use were similar and learning level could be controlled with measurement and evaluation methods. This study finding could be considered as evidence that the participating teachers were not adequately trained in distance education. Since the transition and implementation of distance learning was not a normal process during the pandemic. When justifying the adequacy of the resources and material in distance education, conditions in that period such as implementation factors and economic circumstances

should be taken into consideration.

Among the prominent findings on the implementation of distance education in Turkey during the pandemic based on the views of teachers were those about the measures that should be taken to improve distance education. The analysis of the findings demonstrated that the participants proposed important" recommendations about the distance education process (Table 4). These recommendations included face-to-face live courses, technology-assisted education, improved content instruction, communication between the educational components, and activities that would increase student motivation. The review of these findings presented in Table 4 demonstrated that they included suggestions to improve the meaningful learning levels of the students. The present study findings were consistent with those reported by Rusel (1999) as well as Murphy and Crosser (2010). Based on the present study findings,

(i) Due to the public health problems such as Covid-19, Turkey should define technological material and content for distance education infrastructure and update these requirements based on student levels each year;
(ii) The implementation of distance education process should consider application conditions;
(iii) Educational components (student-parent-teacher) should be informed about distance education;
(iv) Material (computers, tablets) should be provided for the students in distance education;
(v) The distance education should include entertaining and motivating content that would increase students' interest in the process.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Scientific research hypotheses understanding of the pre-service science teachers at Faculty of Education, Amran University, Yemen

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Preparing pre-service science teachers (PSSTs) with the scientific research skills (SRSs) is an ultimate aim of PSSTs' programs. This study aimed to explore PSSTs' understanding level of SRHs (SRHUL). To this end, an action research (AR) was adopted using a pre-post-test design. In doing so, a multiple choice test which consists of 15 items was developed and conducted on a random sample comprising 120 subjects. Results of the study revealed that participants showed insufficient performance on the test of understanding scientific research hypotheses (SRHUT) for both pre and post-test. Besides, results of t-test showed a significant difference between mean scores of pre-test and post-test. The difference was in favor of post-test. Also, results of one-way ANOVA revealed a non-significant difference between or within mean scores of compared groups. Based on the results of the study, some recommendations were made.

Key words: Pre-service science teachers, scientific research skills, action research.

INTRODUCTION

In the context of the 21st century, possessing SRSs is considered as a main goal of education, that is, science education, which leads to rise in SRSs of citizens who could show the scientific aspects of science in their life (Bökeoğlu and Yılmaz, 2005; Irwanto et al., 2017). SRSs can be known as identifying a problem, formulating hypotheses, gathering and analyzing data, as well as interpreting and discussing the results of analyzing data (Fraenkel and Wallen, 2006; Irwanto et al., 2018). Thus, linking such skills should be paramount in the vision of teacher education (Can and Kaymakci, 2015). Also, engaging teacher students in research-based learning is a vital issue in PSSTs' preparation program in order to

carry out such goal, since research-based learning is a key aid in enabling students to develop a deep understanding of SRSs and empowers them to behave as scientists in knowledge acquisition and development (National Research Council, 2007; Can and Kaymakci, 2015).

In addition, SRSs (e.g. formulating SRHs) are the most fundamental underpinnings of teachers' educationprogram (National Research Council, 2007; Irwanto et al., 2018). Involving students in research activities continues to be a critical issue as it will enhance their critical thinking and problem-solving capacities which are compulsory competences for new achievements
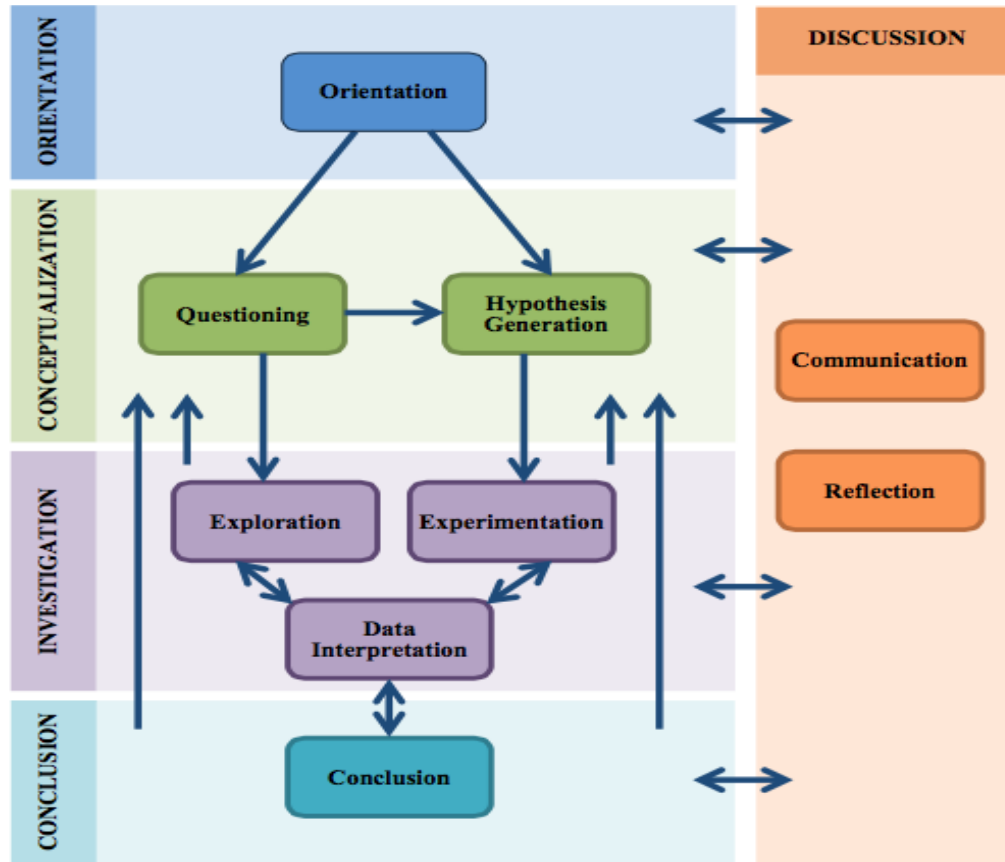
Figure 1. General phases, sub-phases and their relations in doing scientific research.

in education and consequently improve their learning-teaching practice. Thus, SRSs should be considered as an essential goal in students learning as well as a pedagogical method used by teachers (National Research Council, 2007; Irwanto et al., 2017). However, merits of the SRSs cannot be obtained by students unless there are well-qualified teachers who can transfer such skills to their students.

As illustrated in Figure 1, obtaining SRSs requires several practical phases for doing research that PSSTs[1]) should be exposed to. One of these phases involves formulating the hypotheses (Pedaste et al., 2015). Hence, hypotheses formulation is indispensable during scientific research, since it helps the researcher in (1) determining the type of data that will be collected; (2) selecting the instrument/s for collecting data; (3) choosing the suitable means for analyzing data; and (4) organizing such search with others searches (Walliman, 2011; Cohen et al., 2017).

SRHs can be defined as tentative statements that explain and describe a solution to a problem that can supposedly occur as results of testing such statements for accepting or rejecting the expected solution to the problem (Fraenkel and Wallen, 2006; Walliman, 2011). Also, hypothesis is a "statistically measurable/testable prediction of a relationship between one or more variables and the problem under study" (Degu and Yigzaw, 2006: 23). Formulating hypotheses, therefore, is one of the most significant components of SRSs. A person who could formulate hypotheses in a good and easy way, is one who is able to create a good conceptual knowledge (Aydoğdu, 2015; Kabir, 2016, Mourougan and Sethuraman, 2017). Thus, teacher students' skill of formulating hypotheses is a key skill for teachers in mastering the conduct of research and teaching SRSs to their students.

Epistemologically, formulating hypotheses belongs to the scientific integrated processes (such as hypothesis formulating, identifying variables, controlling variables, experimenting and interpreting data, etc.) (Yakar, 2014; Aydoğdu, 2015; Paulo and Cruz, 2015). Hypotheses can be expressed in different formulations: as a null or alternative hypotheses. A null hypothesis, H0, refutes the differences or relationships between variables, while the

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[1] For this study, PSSTs can be defined as the 3rd academic year-students who studied fundamentals of educational research course (FERC) at Faculty of Education-Amran University. In Yemeni universities, PSSTs are prepared to become science secondary school teachers after their graduation (Al-hidabi, 2012). They are exposed to different cultural, professional, and academic courses which FERC is one of the compulsory courses.

Figure 2. Resources of generating and formulating scientific hypotheses.

alternative one, H1, confirms such differences or relationships (Gay et al., 2009:6). In addition, H1 is examined in two ways: directional and non-directional. While the direction of the variables' difference or relationship is stated in the statement of the directional hypothesis, it is not stated for the non-directional hypothesis (Fraenkel and Wallen, 2006).

In the context of hypothesis formulating, there are many sources can lead to researchers in generating and formulating a good SRH. Figure 1 (i.e. created by the 1st author) illustrates the resources that can help researchers to generate and formulate SRH in a suitable form.

With regard to generating and formulating SRHs, there are many sources that lead a researcher in generating and formulating good SRHs, as illustrated in Figure 2.

A good hypothesis should be (Cohen et al., 2017; Walliman, 2011) in a (1) clear, practical, and testable formulation; (2) way that helps researcher(s) to define and determine operationally research's methods, terms, variables, etc.; (3) way that helps researcher(s) to choose and clear up the suitable search design. Yet, acquisition knowledge and skills of SRHs requires well prepared teachers.

In doing so, teachers, mainly science teachers, should be well-prepared via high quality preparation programs at institutions of teacher's preparation. In Yemen, the task of PSSTs preparation for teaching in secondary school is authorized to faculties of education. They (that is, PSSTs) are exposed to undergraduate programs of the professional preparation (3Ps) in a wide variety of content areas. Thus, PSSTs are expected to be skillful for SRSs via such 3Ps. Responding to this expectation, 3Ps often offer a standalone FERC (Kleiner et al., 2007). In the context of Yemeni 3Ps, every PSST is exposed to FERC which supposedly provides them with sufficient knowledge and skills on SRSs, particularly the skills of SRHs. Nonetheless, engagement in understanding of SRSs, mainly SRHs, is critical to the PSSTs.

Aim and problem statement

As educators of FERC, the researchers noticed that PSSTs often enter FERC in teacher 3Ps with a lack of the research content knowledge and skills that deal with SRHs. Such lack may result in part from a limited research content background. This insufficiency may slow down PSSTs' activities of planning high-level learning experiences for their students as well as the activities of teaching SRSs during their practicum, and also lessen teachers' understanding of inquiry as a valuable method in teaching science for conceptual understanding.

To address this general issue, therefore, FERC was added to the 3Ps that Yemeni PSSTs at the Faculty of Education in Amran University are exposed to, as a compulsory course of the 3Ps. It is foreseen that if PSSTs have taken such course, they will develop their knowledge, attitudes, and skills of SRSs like formulating hypotheses.

In addition, exploration knowledge and hypotheses formulation skills of PSSTs at Faculty of Education in Amran University have not obtained much attention. In this regard, this study could contribute to existing literature on SRHs. In addition, results of the recent study could shed light on the existing 3Ps of PSSTs as regards its focusing on teacher development through scientific research and on teacher development via inquiry. Moreover, results of this study will help the researchers, as educators, in improving their instruction. Thus, this study aimed to explore the PSSTs' SRHUL. Specifically, the study attempted to find out the PSSTs' SRHUL as they progress through studying the CFER. More specifically, this study aimed to answer the following questions:

(1) What is the PSSTs' SRHUL at Faculty of Education-Amran University, Yemen?
(2) Are there any differences between mean scores of the

participants (that is, sample of PSSTs) on the SRHUT referred to the variable of test period (that is, pre and post-test)?

(3) Are there any differences between mean scores of the participants on the SRHUT referred to in the variable of participants' major (that is, chemistry, biology, and physics)?

Research hypotheses

In order to answer the second question, the following hypotheses (that is, null and alternative hypotheses) were put forward:

a. Null hypothesis (H0: μ=0): There are no statistically significant differences between the participants' mean scores on the entire SRHUT and its scales referred to in the test period variable.

b. Alternative hypothesis (H1: μ≠0): There are statistically significant differences between the participants' mean scores on the entire SRHUT and its scales referred to in the test period variable.

2nd a. Null hypothesis (H0: μ=0): There are no statistically significant differences between and within the participants' mean scores on the entire SRHUT and its scales referred to in the major variable (that is, chemistry, biology, and physics).

b. Alternative hypothesis (H1: μ≠0): There are statistically significant differences between and within the participants' mean scores on the entire SRHUT and its scales referred to in the major variable (that is, chemistry, biology, and physics).

LITERATURE REVIEW

Many studies in the field of science education and science teachers' 3Ps (that is, PSSTs' 3Ps) revealed that there is a misunderstanding on knowledge and skills of scientific research mainly SRHs. Though the issue of preparing teacher as a researcher has been globally considered and studied by several researchers in diverse educational researches for different purposes (Kuter, 2013; Özdilek and Bulunuz, 2009; Tuberty et al., 2011; Darus and Saat, 2014; Ural, 2016), it was hardly studied in the context of Yemeni PSSTs' 3Ps at Faculty of Education in Amran University.

As relevant literature explores possessing of research knowledge and skills, certain emphasis such as knowledge about SRHs and its formulation is brought to the fore. Moreover, a considerable amount of research has focused on how to improve such knowledge and skills of different subjects, that is, basic schools, secondary schools, and universities (Özdilek and

Bulunuz, 2009; Tuberty et al., 2011; Darus and Saat, 2014; Ural, 2016). Some of those studies used descriptive, quasi-experimental design, while others used pre-post-test to carry out their objectives (Tuberty et al., 2011; Darus and Saat, 2014; Ural, 2016).

Özdem (2009) for instance, conducted a study aimed at exploring PSSTs' argumentation in the context of inquiry-oriented laboratory work. Data of this study were collected through video- and audio-recording and transcribed during the participants' performance of the laboratory tasks. Argumentation schemes developed by Walton (1996) were used for data analysis of this study. Results of Özdem's study showed that PSSTs applied varied premises rather than only observations or reliable sources, to ground their claims or to argue for a case or an action.

Another study conducted by Aydoğdu (2015) aimed to investigate the process skills of Turkish science teachers in terms of some variables. Aydoğdu used science process skills test to collect data. Results of this study revealed that the level of integrated science process skills, formulated by scientific hypothesis, was under the satisfactory level. Also, Aydoğdu (2015) conducted a study aimed at examining PSSTs' skills of formulating hypotheses and identifying variables. To collect data, Aydoğdu used a qualitative approach research (that is, a phenomenological research design). Results of this study showed that participants' skills of formulating hypotheses as well as identifying dependent, independent and control variables accurately were insufficient.

Likewise, a study conducted by Özdilek and Bulunuz (2009) aimed to investigate the effectiveness of a guided inquiry method for science teaching on the elementary PSSTs' self-efficacy beliefs. Özdilek and Bulunuz (2009) conducted a pre-post-test design on a sample that consisted of 101-112nd year-PSSTs of the elementary school who enrolled to a science laboratory course using 'Science Teaching Efficacy Belief Instrument' and focus group interviews for collecting data. Results of this study indicated that the level of subjects' efficacy expectations and outcome expectations on post-test scores were higher than the pre-test scores.

Similarly, Ural (2016) aimed to ascertain: the effect of guide inquiry in doing laboratory experiments on attitudes of the 3rd-year undergraduate Turkish students in science education towards chemistry laboratory; the guide's effect on their anxiety from chemistry laboratory; and the same effect on their academic achievement in chemistry laboratory. To collect data, Ural used a pre-post-test design using Chemistry Laboratory Attitude Scale and Chemistry Laboratory Anxiety Scale as well as semi-attractional interview. Results of Ural's study revealed that there was a significant increase in subjects' attitudes towards chemistry laboratory, their academic achievement, and a significant decrease in their anxiety towards chemistry laboratory.

Also, a study conducted by Yakar (2014) aimed to find

Table 1. Study's population and sample.

	Population	Chemistry	Biology	Physics	Total	%
		81	74	72	227	100
Sample	Pre-test	40	40	40	120	53
	Post-test	40	40	40	120	

Table 2. Items' distribution of the SRHUT among its sub-scales.

Scale	Items	Total
SRHs' knowledge	1, 2, 3, 4, 5, 6, 9 and 10.	8
SRHs' formulating	7, 8, 11, 12, 13, 14 and 15.	7
-	-	15

out the effectiveness of scientific process skills on a sample selected from PSSTs of Pamukkale University Primary Science Teacher Education Program for four years. To collect data, Yakar used a survey approach.

Results of this study, as regard formulation of scientific hypothesis, indicated that PSSTs at Pamukkale University in Turkey can describe and identify the appropriate hypotheses, decide and test them as well as determine the research variables that deal with the tested hypothesis.

In the context of Yemeni on related literature review, only one study is related to the recent study conducted by Aziz and Zain (2010). This study aimed to compare science process skills in the content of Yemeni physics textbooks for the 10-12th grades. Although the study revealed strengths in the analyzed textbooks' content, it showed a number of integrated science processes have been neglected such as measuring, predicting and hypothesizing processes.

METHODOLOGY

Mixed research methodology is a common scientific research method (Blaxter et al., 2006). Thus, a mixed research approach (that is, descriptive and quantitative research approach) was used to carry out this study. Descriptive research approach was used to answer the 1st question of the study, while pre-test and post-test one-group was used to test its hypotheses. Pre-test and post-test is categorized as an experimental approach, but it is educationally used as a quasi-experimental research approach (Womack, 1997; Walliman, 2011; Ural, 2016).

Due to that, this study does not include a true experiment; therefore it does not belong to the experimental studies. Eight terms should be verified for the true experiment: (1) control group/s; (2) experimental group/s; (3) random sample; (4) equivalence; (5) a tool to measure the independent variable effect on the dependent variable; (6) intervention to the experimental group/s; (7) isolation, control and manipulation of independent variable/s; and (8) non-contamination between the control and experimental groups (Cohen et al., 2007). If one of the previous terms is not seen through the experiment then it is not experiment; it can be looked as a quasi-experiment (Cohen et al., 2007). Thus, this study is a quasi-experimental study.

Data of the study were collected using the pre-post-test one-group design, from a sample that consisted of 120-123rd-year PSSTs at Faculty of Education, Amran University in order to test the study's hypotheses. Moreover, this study belongs to AR (that is, AR is a systematic search procedures conducted by practitioners, teachers or other individuals, in an educational context to collect data about teaching-learning situation in order to improve and develop teaching and learning in such context) (Creswell, 2012; Ali and Akayuure, 2016; Abelardo et al., 2019). Based on the previous definition of AR, AR can be theoretically taken as an incorporation component of the study's overall process.

In addition, AR is flexible; hence it can be used as a separate research approach, or as a part of it (Wiersma, 1985; Womack, 1997). Furthermore, this study can be considered as an AR because it reflects the collaboration of the faculty staff (that is, the authors of the study) in conducting research that will enhance understanding of some issues involving SRHs that was taught to PSSTs by the authors themselves (Ferrance, 2000).

Sampling

Participants in this study were 120 PSSTs university 3rd-year students who studied the FERC at Faculty of Education, Amran University, Yemen. They were randomly selected from a population consisting of 227 PSSTs, that is, 40 participants from three departments (biology, chemistry and physics), as illustrated in Table 1.

Instrumentation

A multiple choice test, that is, SRHUT, was developed by the researchers themselves as an instrument to fulfill this study. Test items were developed and presented on the related literature as well as analysis of the sub-topics related to SRHs. Besides, the test items covered two areas: knowledge and formulating of SRHs (Table 2). SRHUT consisted of 15 items, with each remarked as 1 for the true answer, or zero for the false one. Consequently, the test maximum mark was 15, while the minimum was zero. Test items were developed in terms of document analysis of the literature, and text of student's course that deals with SRHs and their formulation.

For further testing, the SRHUT's applicability, comprehensive validity and reliability were figured out. For validity, it was given to 3 experts (that is psychologists and educationalists) to figure out its content validity. Experts were asked to evaluate the test items in terms of the clarity and accuracy of each item. They were also asked to be free in adding, removing, or modifying any of its items.

Table 3. Participants' responses percentages on SRHUT's items for both pre and post-test.

Item	Test (%)		Scale		Sub-scale
	Pre-test	Post-test	Knowledge	Formulating	
1	51	95	√		Definition of SRH
2	39	54	√		SRH and scientific theory
3	40	88	√		SRH and research problem
4	34	82	√		Sorts of SRHs
5	43	50	√		Standers for a good SRH
6	76	88	√		Sources for the SRH
7	48	87		√	Example for formulating SRH
8	47	93		√	Example for formulating SRH
9	25	38	√		Statistics and SRH
10	14	10	√		Sorts of SRHs' errors
11	12	12		√	Example for formulating SRH
12	3	49		√	Writing directional SRH
13	2	13		√	Writing non-directional SRH
14	3	21		√	Writing null SRH
15	3	20		√	Writing alternative SRH

An entirely consensus (100%) outcome among the experts were taken as a criterion to accept the item. As for the reliability of the test, Cronbach alpha was figured out and found as 0.67 which is an adequate and acceptable coefficient (Taber, 2016).

Subjects were then exposed to SRHTU as a pre-test before teaching them SRHs as a topic, thereafter they were taught during the 2nd semester of the 2019 academic year by the 2nd researcher. Time period for pre-test was 30 min, while that meant for teaching the topic was 2 h. After teaching the topic, subjects were again exposed to the same test as a post-test. Afterwards, their responses on the test were collected to be analyzed and compared with their responses on the pre-test.

Procedures

In this study, eight main procedures were implemented: (1) sampling, that is, choosing the sample of the study from the PSSTs' population; (2) reviewing the available literature; (3) identifying the sub-topics of SRHs; (4) instauration, that is, development of SRHUT; (5) teaching participants SRHs as a topic; (6) collecting data via participants exposed to the pre-post-test on the SRHUT; (7) analyzing data; and (8) interpreting data.

Data analysis

Different statistical tools were applied to analyze the data of the recent study. To answer the study's first question, descriptive statistics (that is, frequencies, and percentages) were conducted. A variety of statistical tools (e.g. T-test, ANOVA, ANCOVA, MANOVA, MANCOVA, etc.) were used to analyze the pre-test and post-test data as an AR (Borg, 1987; Charles, 1988; Womack, 1997; Ural, 2016). Thus, independent sample t-test was used to compare the mean scores' of pre-test and post-test in order to test the first hypothesis of the study as an answer for its second question. In addition, one-way ANOVA was used because the analysis of variance deals with the differences between or among sample means. Moreover, test of Tukey-HSD was used to investigate the homogeneity of the study's groups (Pallant, 2005).

RESULTS

Results of this study were set according to the study's questions and tables used to illustrate its results. According to the 1st question 'What is the PSSTs' UL of SRHs at Faculty of Education, Amran University in Yemen'? Participants' percentages of the responses on the pre-test and post-test were figured out before and after teaching SRHs as a topic. While the percentage of pre-test for all the subjects' items was found as 41.6%, it was 50.6% for the post-test. As shown in Table 3, all pre-test items excluding the 1st and 6th items were less than 50%. On the other hand, the percentage of each of the first eight test items of the post-test was greater than 50%, while the percentage of each of the rest test items was less than 50%.

As illustrated in Table 3, regarding items' percentages of the SRHUT, every item of the test had less than 50% except for 2 items (that is, 1.51 and 6.76%) which belong to knowledge scale of the test. The 1st item dealt with the definition of SRH, while the 6th item dealt with the SRH's sources. On the other hand, 7 out of 15 (47%) of the test items (9, 10, 11, 12, 13, 14, and 15) were found to be less than (50%). All of these items except for 9 and 10 belong to the scale of formulating hypotheses skills, whereas the rest two items belong to the knowledge scale.

In order to answer the study's second question (that is, are there any differences between mean scores of the participants on SRHUT referred to in the variable of test period (that is, pre and post-test)?), a null and alternative hypotheses were put forward and tested. As for the null hypothesis (that is, H0: μ=0), there are no statistically significant differences between participants' mean scores on the entire SRHUT and its scales referred to in the test

Table 4. t-test for comparison of pre and post-test groups on SRHUs' mean scores.

Scale	Group	N	Mean	S. D	T	df	P
SRHUs Knowledge	Pre-test	120	3.24	1.58	-10.45	206.09	0.001
	Post-test		5.05	1.04			
SRHUs Formulating	Pre-test	120	1.12	0.96	-9.12	217.23	0.001
	Post-test		2.54	1.33			
All SRHUT's items	Pre-test	120	4.41	2.03	-12.64	238	0.001
	Post-test		7.60	1.87			

Table 5. One-way ANOVA between and within sample groups the SRHSU.

Domain		Sum of squares	df	Mean square	F	P
Knowledge Domain	Between	4.41	2	2.20	0.84	0.43
	Within	619.49	237	2.61		
Formulating Domain	Between	6.86	2	3.43	1.90	0.15
	Within	427.04	237	1.80		
All SRHs' Items	Between	1.30	2	0.65	0.10	0.90
	Within	1512.70	237	6.38		

period. Results of t-test for independent samples revealed (Table 4) that there are statistically significant differences between participants' mean scores on the entire SRHUT and its scales referred to in the test period variable, since the value of 'P' (0.001) was less than the required cut-off (0.05), and all differences, in all comparisons, were in favor of the post-test. Based on the t-test results, therefore, the null hypothesis dealt with the 2nd question, was rejected and the alternative one was accepted.

As regards the 3rd question "are there any differences between participants' mean scores on the SRHUT referred to in the participants' major variable", the 2nd null hypothesis states that "there are no statistically significant differences between and within the participants' mean scores on the entire SRHUT and its scales referred to in the major variable (that is, chemistry, biology, and physics)". In doing so, one-way ANOVA was used to investigate such differences.

Results of one-way ANOVA, as illustrated in Table 5, indicated that there are no statistically significant differences between and within the groups participants' mean scores on the entire SRHUT and its scales referred to in the major variable, since the value of 'P' for all comparisons between and within groups was greater than the required cut-off (0.05). Consequently, the 2nd null hypothesis was accepted, while the alternative one was rejected.

In addition, Tukey's Honestly Significant Different test (HSD) was used to find out the directions of these differences. Similarly, results of HSD pointed to acceptance of the 2nd null hypothesis and rejection of the alternative one (Table 6), since the value of 'P' for all comparisons between and within groups was greater than (0.05).

DISCUSSION

In general, results of the study revealed that PSSTs' SRHUL on the SRHUT was insufficient, while PSSTs' SRHUL for the post-test was greater than it for the pre-test. This insufficiency may be due to the insufficiency of the knowledge and skills necessary for dealing with SRHs that PSSTs were exposed to either via the preparation program's courses or through their pre-university education (that is, basic and secondary education). Such interpretation can be deducted from a study conducted by Aziz and Zain (2010), which revealed that content of physics textbooks for the 10-12th grade insufficiently included a number of integrated science processes such as hypothesizing process. On the other hand, as regards post-test, results showed that most of the test's items which got a percentage that is over 50% belonged to the scale knowledge of SRHUT. This may be due to lack of attention on SRHs process particularly

Table 6. Results of Tukey's honestly significant different test (HSD).

Group	Scale	Mean difference	Std. error	Mean			P
				Chemistry	Biology	Physics	
Chemistry Biology Physics	Knowledge scale	-0.29	0.26				0.5
Biology Chemistry Physics	Knowledge scale	-0.29	0.26	4.05	4.05	4.34	0.5
Physics Chemistry Biology	Knowledge scale	-0.29	0.26				0.5
Chemistry Biology Physics	Formulating scale	0.175000	0.21				0.69
Biology Chemistry Physics	Formulating scale	0.175000	0.21	2.05	1.88	1.64	0.69
Physics Chemistry Biology	Formulating scale	-0.412500	0.21				0.13
Chemistry Biology Physics	All SRHUT's ıtems	0.18	0.40	6.34	6.03	6.12	0.90
Biology Chemistry Physics	All SRHUT's ıtems	-0.18	0.40	6.34	6.03	6.12	0.90
Physics Chemistry Biology	All SRHUT's ıtems	-0.13	0.40	6.34	6.03	6.12	0.95

formulating hypotheses within the courses' content of PSSTs' preparation program at Faculty of Education in Amran University.

Results of this study are in line with those of Aydoğdu (2015) and Irwanto et al. (2018), but differ from the results of Yakar (2014). While the studies of Aydoğdu (2015) and Irwanto et al. (2018) revealed that participants' skills of formulating hypotheses were insufficient, results of Yakar (2014) study showed that PSSTs could sufficiently describe, identify, formulate SRHs and test them.

As regards the 2nd question's results, t-test outcomes showed that there are statistically significant differences between mean scores on the entire SRHUT and its scales referred to in the variable of test period; and the differences, in all comparisons, were in favor of the post-test. In other words, the mean scores on the entire test and its scales (that is all SRHUT's items, SRHUs Knowledge, and SRHUs Formulating) for post-test were greater than the mean scores of the same test for the pre-test. Obviously, teaching SRHs to PSSTs gave rise to the improvement of participants' achievement on the SRHUT for the post-test. But this improvement is not sufficient particularly with respect to the results of

formulating hypotheses skills. In this context, some studies (Paul, 2015) reported that it is not only students that have a problem dealing with formulating SRHs, but teachers also do.

Conclusion

In the 21st century context, possessing SRSs is considered as a main goal of science education. For this reason, this study was aimed at exploring the PSSTs' SRHUL as well as finding out the differences in their understanding level as they progress through studying CFER. To this end, a validated and reliable instrument (that is, SRHUT) was developed and conducted on a sample of PSSTs before and after studying the topic of SRHs at the Faculty of Education, Amran University. According to the study results, participants showed insufficient performance on the SRHUT, as a result of the pre-test and vice versa in terms of the results of the post-test.

Although a significant difference was found between mean scores of pre-test and post-test, by using t-test, which was in favor of post-test, there were no significant differences between or within mean scores of compared groups, as a result of one-way ANOVA. Results indicated that PSSTs' performance of the post-test on SRHUT was greater than their performance of pre-test because of the teaching of the SRHs topic. The significant differences between or within mean scores of compared groups, as a result of one-way ANOVA was due to the homogeneity of the study's sample.

In a few words, one may conclude from the result of this study that PSSTs have insufficient knowledge and skills on the SRHs. Although the results reveal that participants' achievement on the SRHUT for the post-test was greater than their achievement on the same test for the pre-test, this achievement is still insufficient particularly with respect to the results of formulating hypotheses skills.

RECOMMENDATIONS

Due to the importance of enabling students' acquisition of SRSs, SRSs are universally given an important consideration in science education. Thus, in-service and pre-service science teachers should be well prepared towards providing SRSs. To make this possible, science teachers (PSSTs) should be well prepared in terms of acquisition of SRSs which could not be a reality unless these teachers are exposed to good preparation on SRSs via the preparation programs in the faculties of education. Therefore, evaluation studies on the PSSTs' preparation programs based on the inclusion of SRSs within the programs' contents and activities is recommended.

In addition, as the recent study was limited to SRHs as a topic as well as PSSTs who enrolled in a fundamental

scientific research course at the Faculty of Education, Amran University, its results, therefore, could not be generalized to other population or topics. Based on this limitation, it is recommended that similar studies be conducted on different populations and topics of SRSs.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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The problems that Syrian refugee children, class teachers and Turkish children face in the school environment from the standpoint of trainee teachers

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The aim of this study is to indicate the problems that Syrian refugee children, class teachers and Turkish children face in their school environment. The data of this study were realized via case study design which is one of the qualitative investigative designs. Interviews were carried out using the observation notes of the prospective teachers as well as their semi-structured discussion forms. As a result of the content analysis of data obtained from the research, it was seen that the most significant problem faced by the study participants was "language problem". In connection with the language problem, it was seen that factors such as adaptation, communication, and pedagogic condition, social and emotional development influenced them negatively. As the Syrian students do not know Turkish and they are taught with the traditional methods, they do not benefit from the teaching activities and they get bored in classes. While this situation causes behavioral problems in the classroom, the teachers spend more time with the Syrian students. This makes them to fall behind and not to finish the curriculum in time. It is recommended classroom teachers should receive training on how to teach in a multicultural classroom, language courses should be opened, designated based on their age and knowledge of Turkish to solve the language problem of Syrian children and adults and classroom teachers should receive "Teaching Turkish as a Foreign Language" education.

Key words: Syrian refugee children, integration, class management, multiculturalism, immigration.

INTRODUCTION

Turkey has always been a country receiving immigrants or a transit country due to its location. After the "Syrian Crisis", which started in March 2011, Turkey began receiving immigrants from its neighbor Syria. Turkey has become a country where most Syrians immigrated as a result of the "open gate policy". According to the data from General Directorate of the Immigration Office (URL, 2020a) dated February 2020, the number of refugees coming to Turkey has reached 3.587.566. According to the February 2020 data of the Refugees Association

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(URL, 2020b), approximately 520,000 of this number consist of children of elementary school age.

The Syrians were given shelter and medical facilities considering the fact that immigration would soon come to an end and they would return to their country. Most people thought the war would last longer than it was expected; hence activities in the field of education were also dealt with. It is obvious that extreme increase in the number of refugees and dispersion of most of the refugees out of the camps have led to challenging problems in education, as well as in other areas. Besides being involved in designing education in the camps, from 2013 on Turkey has taken crucial decisions and implemented them to design education outside the camps (Seydi, 2014).

By the end of 2019, education for the refugee Syrian children had been carried out within and outside the camps via Temporary Education Centers and State Schools and private schools owned by Syrians. The Syrian children who attend state schools receive education from Turkish teachers in accordance with the Turkish curriculum in the same classes as the Turkish children. As for the Temporary Education Centers (TEC), there are education centers which offer education in Arabic to the Syrian children and youngsters at the school age according to the Syrian curriculum covering the elementary and junior high levels. The curriculum implemented in these centers is the Syrian curriculum and it is carried out by voluntary Syrian teachers. These teachers are paid via a project within the scope of UNICEF and PTT (Turkish Postal Service) collaboration (Emin, 2016). Following the end of 2019, GEMs were closed and the strategy of giving education to Syrian children only in state schools was adopted (URL, 2016a).

The abundance of actors for the education of Syrian refugees – such as the host country, UN, NGO's (Civil Social Groups), disparity of the expectations and power conflict complicate the refugee education (Özer et al., 2016). In the countries where Syrians have migrated, due to the political decisions in education and the gaps in the implementation, the lack of legal status and the role of the international actors, several difficulties have aroused in the realization of these decisions (Buckner et al., 2018: 444). In spite of all these difficulties, Turkey has contributed extensively to the Syrians under her reassurance by pursuing "open gate policy". A lot of practices have been done and are still in progress such as the schools in the camps, education in the state schools with the Turkish children under the same conditions (Dillioğlu, 2015: 10), education given in GEMs in their own language and curriculum for them not to lose a school year when they return to their country, in-service training to the Syrian and Turkish teachers, training to the contracted teachers to teach the Syrian students in Turkish, training to the counselor teachers for support for the Syrians, training to the teachers who have alien students in their classes (URL, 2016b). In spite of all

these practices, there are still educational problems for the students. Tüzün (2017: 12) outlines some of the problems as follows: physical capacity of the schools and classrooms, potentiality for psychosocial and academic support, facilities for language learning, discriminatory attitudes, isolation and peer violence. It is seen that, in the construction of a common future, completing the regulations for the Syrian children to be involved in the education system is not sufficient although it is a crucial step for the resolution of the problems. Structural obstacles in spite of convenient regulations, frequently seen poor living conditions of the refugee children, poverty, need to work, insufficient care, in case of ambiguity inconsistency of the families for education and changing assessments for the good of education all influence access to education for the children (Özer et al., 2016: 194) and the level of benefiting from education. A similar situation is experienced by Syrian children who emigrate to Lebanon. Due to the burden of educational expenses or to help their families economically, fewer children attend school; but more children attended school when their families were supported economically on the condition that their children must continue studying (De Hoop et al., 2019).

The school and the teacher have an important point in the life of a child. In addition to all the deprivations in their lives, being in another country as a refugee in the same environment with people whose language they are not familiar with is much more difficult for those children. Adjustment for the Syrian students to their classes and freeing themselves from unfavorable experiences are closely related to their teachers' approach and attitudes. In this sense, the teachers working in elementary schools have a great responsibility. Adopting themselves to the normal life after such misfortunes and loving the country they are living in are compatible with the attitudes of their class teachers (Sağlam and İlksenKanbur, 2017: 312; Rubinstein-Avila, 2017).

In the literature, there are many studies about the problems Syrian children experience in their countries of migration. A study examining the inclusion of Syrian refugee children in school systems in Sweden, Germany, Greece, Lebanon and Turkey shows that these children are not given a high-quality education and rich materials and teachers are not trained to learn a second language (Crul et al., 2019). At the same time, Syrian children have been struggling for years with war and they have to emigrate from their countries. They witnessed the torture, maiming and death of their neighbours, brothers and parents. In the places where they emigrated to, they were subjected to discrimination and racist behaviour without receiving proper education, shelter and food. Therefore, many of them experienced depression and anxiety (Kandemir et al., 2018). A study that compares school systems in Europe with respect to refugees found that perceived discrimination is a strong negative predictor of a person's separation from school and the society in

Table 1. The number of students who were observed and the status of speaking Turkish.

Class	Number of Turkish students	Number of Syrian students	Total	Number of syrian students who speak Turkish
1	15	19	34	10
2	20	9	29	5

general. Due to the compulsory education age limit, when students who start school late due to immigration finish primary school, the alternatives for multi-choice secondary schools are either vocational schools or low-level schools. This poses problems for children who are unable to realize their complete potential. In European countries, Sweden is a good example. After determining literacy and math skills of children from the country, they were placed in a training program to fit their needs (Koehler and Schneider, 2019; Chimienti et al., 2019). In a study of Syrian refugee children and their families who settled in Canada, Syrian children did not only have difficulties in making friends among local students, but were also subjected to constant bullying and racism which in turn affects their sense of belonging and connection. To prevent this, it is suggested that the children of the host country be informed about the difficulties experienced by Syrian children (Guo et al., 2019). In a similar study conducted in Turkey, it was shown that class teachers had difficulties in teaching Syrian students reading and writing in Turkish as a foreign language and also it appeared that they experienced many problems developing their language and communication skills (Işıkdoğan-Uğurlu and Kayhan, 2018). This and many similar studies examine the academic and emotional problems experienced by Syrian students.

This study investigates the problems experienced by Syrian children, children of the host country and classroom teachers. The difference and importance of this work is created by the point that the events experienced by classes with Syrian children were analyzed from a multifaceted point of view arising both from Turkish and Syrian students and from the eyes of the trainee teachers. Syrian students experience a lot of problems as well as the class teachers and the other students in the same class. As it is necessary to know how the laws, regulations and legislations were introduced in 2011, how the practices of NGOs and how the UN, integration and inclusive educational activities are taught to the Turkish and Syrian students and class teachers in the school environment, the main objective of this study is to discover the problems that Syrian refugee children, class teachers and the Turkish children face in the school environment. For this purpose, responses to the following questions were sought:

1) Which problems do the class teachers who have Syrian students in their classes face?
2) Which problems do the Syrian students who attend state schools come across in class?

3) Which problems do the Turkish students who have Syrian students in their class face?
4) What are the solutions of prospective teachers to the problems experienced in a multi-cultural class?

METHODOLOGY

Pattern of the research

This research has been designed as a qualitative case study in order to designate the problems which class teachers who have Syrian students in their classes, Syrian students and Turkish students. Cases appear in several forms such as the events that we come across in daily life, experiences, perceptions, tendencies, concepts and circumstances. Case study is used for studies that aim to investigate events which are not completely unfamiliar to us and at the same time the meaning of which we do no grasp appropriately (Yıldırım and Şimşek, 2016: 69). The difficulty of conducting experimental and semi-experimental work on displacement and other humanitarian crisis environments is well known (Puri et al., 2017). It is observed that the trainee teachers started their internship in order not to disturb the Syrian students and not to disrupt the classroom environment.

Study group

This study was carried out in the 2018-2019 fall semester with 8 senior students of the class teaching department who went to practice teaching in schools where there were Syrian students. When the study group was chosen, typical situational modelling – one of the relevant modelling methods – was used. In accordance with this study, "students who went to schools for observation where Turkish and Syrian children studied together" were chosen. Typical situational modelling is to designate the typical ones out of several situations in the universe (Büyüköztürk et al., 2018: 93-94). 4 of the eight prospective teachers had observations in the first grade, the other 4 in the second grade. The characteristics of the classes where observations were held:

First Grade: The total of the students is 34, 15 Turkish and 19 Syrian.10 of the Syrian students speak Turkish, 9 do not. In the classroom, there are a computer and a projector, a locker for the teacher and a cabinet for the students to put their lesson material in. They arrange posters depending on certain days and weeks, but visual aids related to lessons are made up of works done by the prospective teachers.

Second Grade: The total is 29, 9 of which is Syrian. 5 of the Syrian students speak Turkish. The classroom layout is the same as the first grade.

In Table 1, there are 34 students in the first class, and more than half of them are Syrian students. Of the 19 Syrian students, 10 are fluent in Turkish. Among the 29 students in the second grade, 9 are

Table 2. The problems the class teachers who had syrian students in their classes faced (n= 8).

Themes	Codes	*f*
In Terms of Language and Communication	Children who don't speak Turkish don't participate in the lesson	7
	The teacher opens their books because they don't understand the direction	1
	The teacher can't communicate with the Syrian children and their parents who don't speak Turkish	1
Academic Point of View	The teacher do not prepare separately for the lesson	6
	The students are good at math but bad in other lessons	2
In Terms of Class Management	One to one support to those who don't understand, the others get bored	4
	The teacher spends more time for the Syrian students to understand	2
Total		**23**

Syrian. 5 of these children can speak Turkish.

Collection of data

The data of this research were gathered via observations from the interviews with the prospective teachers who went to schools for observation where Turkish and Syrian children received education As a result of literature scanning, open-ended 12 observation questions were prepared in order to determine the problems the teachers, Syrian and Turkish students had in the class environment. The observation questions were arranged and developed after consulting an instructor specialized in the field of qualitative research. The prospective teachers made their observations for 5 weeks and wrote their impressions in forms. For the face-to-face interviews, semi-structured interview forms composed of similar questions were used. The interviews were recorded upon permission; the researcher also took notes. Observations were performed with eight and interviews with three prospective teachers. The interview notes have been coded as A, B, C. The interviews lasted 90 min; 30 min for each. Of the teachers who were interviewed two observed in the first grade and one in the second grade.

Data analysis

Content analysis was used in the data analysis. For the content analysis, first the codes in the data set were found, then the themes taken from the codes were designated; the codes were arranged according to these themes. The themes were classified according to the research questions (Yıldırım and Şimşek, 2016: 253). Moreover, one-to-one extracts from the observation and interview results were placed at the end of each table.

Validity and reliability studies

For persuasiveness within the scope of validity (internal validity), interview data were arranged in the written form to provide participant confirmation and they were presented to the prospective teachers for agreement. To look into the research objectively and to provide consistency (inner reliability) or reliability in the research, a researcher who specialized in education and qualitative research was consulted for help in preparing the interview and observation forms. Furthermore, compatibility and consistence of method diversity –observation data and interview records and notes-, and observations of the researcher in the same environment twice have contributed to providing persuasiveness (inner validity) in the scope of validity. By using the formula: Reliability agreement number / agreement + agreement number for reliability, two researchers worked at different times for the same data and reached similar results; .86 was found (Miles and Huberman, 1994).

Data

In this section, the data are handled by the sub-problems of the research. In Table 2, the prospective teachers say that class teachers frequently have problems of language and communication contacts. During the observation results and interviews, it was surprising to see that the prospective teachers thought "teachers do not prepare distinctively for lessons" was not a problem for the Syrian students but a problem the teachers had. When the reason was asked during the interviews, the answer was like that:

"*Although coming to class unprepared affects students negatively from the academic point of view, it returns to the teacher as a problem because it results in unwanted behaviors in class –doing other things because they cannot learn, talk to other students, and damage their peers etc.*" (A, B-1st Grade).

Another aspect during the observations and interviews; as an answer to the question "*What are the problems the teachers have?*" they gave examples from the problems the Syrian students had. During the interviews, the answer given to the question "*What does the teacher do in class*?" is that:

"*The teacher does not do anything different for the Syrians. At least I don't see it. He places the Arabic and Turkish students side by side to realize peer learning and to enable them to learn Turkish. Thus, the Syrian students perceive the directions 'like which page to open' by following their Turkish peers. In addition, the teacher utilizes the Syrian students who speak Turkish as an interpreter to overcome the language problem*" (B-1st Grade).

"*The teacher teaches the whole class using the traditional methods. He does not invite the Syrian students to the board and does not ask them questions. The last two hours are for free-time activities. In those hours he deals with the Syrian students one by one.*" (C-2nd Grade)

Table 3. The problems the syrian students who attend state schools have (n=8).

Themes	Codes	f
In Terms of Emotional Development	Being ridiculed	6
	Lack of self-confidence	3
	Those who don't speak Turkish want to leave class	1
	When there is a theft in class the Syrian are first accused	1
	The teacher does not create competition	1
From the Academic Point of View	They don't participate in the lesson because they don't speak Turkish	5
	They talk to their peers during the lesson	1
In Terms of Language and Communication	Some speak, others do not	4
	They are always in communication	1
	When the Turkish and Syrian children argue, the Syrian children fall into a guilty situation because they cannot express themselves	1
Total		**24**

Upon the assessment of the statements it was clear that basically the problems are language issue and lack of empathy.

"*The teacher does not discriminate among the students; he does not pay special interest, either. The teacher does not deal with the students. He does not to pay too much attention. This situation is also difficult for the teachers because more than half of the students are Syrians. If a Syrian child writes correctly during dictation activities,* local students face accusations such as *"I don't believe you. Even the Arabs can write, you cannot, go and get to sleep." This creates competition among the students. The teacher seems to have postponed the problem arising out of this. During our talks with the teacher, he said "they will learn with time.* "It happened exactly like that. They are learning now though not in the first 2-3 weeks. They had great development. The children who couldn't read and write can write very well now. It seems necessary to leave it to time. They read and write almost mechanically. When the teacher rewards or punishes, he does not discriminate as Turkish or Arabic. He doesn't discriminate when taking their photographs and hangs them on the wall. The children thus have the sense of belonging. But one of the reasons for lack of communication between the Turkish and Syrian children is that the teacher compares them. The statement "*Even they have answered this. You go and get to sleep!" makes the Turkish students angry and so they complain to the teacher about Syrian students even for their small mistakes or make fun of them to leave them in a difficult position" (A-1st Grade). The teacher does not create any exceptions for the Syrian children. There is neither discrimination nor interest. The teacher remains neutral. If he has a special interest in the Syrian students, I think the Turkish students will feel discriminated. For this reason he remains unbiased. There is not a difference for them to understand the lesson. He interferes only when he sees mistakes*" (C-2nd Grade)

According to the observation and interview results of the prospective teachers in Table 3, it seems that Syrian students mostly have problems in terms of social-emotional development. They are exposed to ridicule because they do not speak/understand Turkish and they pronounce words in a wrong way. The situation they are in maims their self-confidence. Another interesting thing in the table is that the teacher allows competition in a multi-cultural class. In the interviews, it was explained that this competition was like "*giving a star to the ones who wrote correctly*

during dictation activities and sharing their photographs in the WhatsApp class group."

The main problem in Table 3 is also "not speaking Turkish." This problem hinders their communication with their peers and their academic and social-emotional development. During the interviews after the prospective students said the teacher did not discriminate in any way, they added "*When the teacher punishes somebody, he does it before all the students. He also uses physical violence, and gets angry. He does it to the Syrian students more frequently because his communication with them is a bit more broken when compared to Turkish students. They cannot express themselves. The teacher gets angry and hits, for them to supposedly, tell the truth. The child being hit is generally isolated from the class. They think the teacher doesn't like him/her; we shouldn't also like him/her. When the Turkish students are also hit; the class isolates them in the same way*" (A, B-1st Grade).

"*Syrian students have difficulty reading. Because Arabic is read from left to right, they read the Turkish texts in the same way. For example instead of "al" they read "la"* (C-2nd Grade).

The B coded teacher candidate made this statement about the problems the Syrian students had:

"*When two Turkish and Syrian students argue, the Turkish one tends to get even angrier and shouts. He gets angrier because he doesn't understand the language he speaks and he thinks he has said swear words, thus he hits him more.The teacher brings them in front of the class, asks them to apologize and settles the situation. He punishes them whether they are Turkish or Syrian. He tells them to stand on one foot.*" (B-1st Grade)

In Table 4, it is seen that the Turkish students also get irritated because they cannot communicate with the Syrian students. That means the Turkish children also have "language problem" in another dimension. At the interview, the trainee teachers stated that the Turkish students have more advantage than the Syrian students in terms of social and emotional development, saying that "*the Turkish students feel that they belong to the environment. They think that they didn't come there afterwards like the others. They feel they are the hosts. They are more powerful when*

Table 4. The problems the Turkish students who have Syrian students in their classes face (n=8).

Themes	Codes	f
In Terms of Language and Communication	Generally Syrian and Turkish children communicate with their groups	2
	They fight because they don't understand each other due to lang. prob	2
	When the teacher compares, communication is spoilt among the children	2
	Nobody wants to be friends with the Syrians because of personal care	1
	The Syrian children are more inclined to violence	1
	Some Turkish children play with the Syrian children but others don't	1
	The Turkish children refuse the Syrian children	1
From the Academic Point of View	When the lessons are presented in detail, they lose interest	2
Total		**12**

Table 5. The solution proposals of the trainee teachers for the problems in a multi-cultural class.

Themes	Codes	f
From the Academic Point of View	Syrian students should attend only Temporary Education Centers (GEM)	2
	A supplementary Education center should be opened in the school	2
	Teachers should be taught Arabic	1
	Teachers should use body language for the Syrian children	1
	Teachers should apply more efforts for the Syrian children	1
In Terms of Language and Communication	Courses should be opened in the school for them to learn Turkish	4
	Turkish language teachers should be recruited for the pre-school period because their main problem is language	2
From the Social and Emotional Point of View	Welfare campaigns should be started for the Syrian students	1
Total		**14**

communicating with the teacher. I think their emotional connections are more powerful. The parents are more interested. They feel they are in a better position when compared with the Syrians" (A-1st Grade). The number of sub-themes is 2 "Language and Communication". During the interviews the trainee teachers reported: "*Even the poorest of the Turkish students are not at the bottom in class because one of the Syrian children is always the worst. This situation increases the self-confidence of the Turkish children.*" (B-1st Grade)

From the academic point of view, the class teacher teaches the Syrian students who do not speak Turkish and he even invites them to his table and explains the subjects if they do not understand. This situation bores the Turkish students. Unwanted behaviors happen among bored students. During a two-week observation by the researcher, the 1st year teacher said:

"*I had very successful students, but after the arrival of the Syrians, their families began to transfer them to other schools one after another because we could not do the teaching activities efficiently and intensively. We always had to start from the beginning and explain to the Syrian students several times. The parents transferred them to other schools because they did not want their children to fall behind. The language problem is also an annoying issue. Understanding and being understood which is fundamental*

for friendship relationships do not occur among the children. Because they do not understand what they say to each other, they even impose the worst meanings and show reactions."

The solution proposals of the prospective teachers in Table 5 are under three topics namely "from the academic point of view", "in terms of language and communication" and "from the social and emotional point of view". The prospective teachers had proposals like "from the academic point of view, Syrian students should be taught in GEMs, courses should be opened in schools, teachers should learn Arabic, teachers should use body language for communication with the Syrian children, they should spend more energy in classes; in terms of language and communication, Turkish courses should be opened in the school, Turkish teachers should be recruited for the pre-school period; from the social and emotional point of view, welfare campaigns should be arranged." The opinions of the prospective teachers are as follows:

A-coded trainee teacher said during an interview: "*It is wrong to put the Syrian children among the Turkish children. There is not an intelligence problem. The biggest problem is language. If this is solved, it will be enough. The Syrians who speak Turkish learned it in the camps. Separate schools can be opened for Turkish or the number of class hours can be different. There can be supplementary courses. They don't understand even if they can*

read. In my opinion, if they are to be in the same class, both the teacher and the families should support them. The families of the Syrians who are poor in class are not concerned. The teacher is more interested in the children whose parents come and talk to him." (A-1ˢᵗ Grade)

"*I would start a project in the school to teach Turkish to the Syrian children. Teachers who know both Turkish and Arabic should be the ones to teach them. The course should be at weekend or after school. In addition, there should be a supplementary center in the school. Turkish should be taught primarily.*" (B-1ˢᵗ Grade)

"*Attending the same class for Turkish and Arabic students causes the Turkish students to fall behind. They should follow the Turkish curriculum in the same school but in different classrooms*" (C-2ⁿᵈ Grade).

The trainee teachers say they think it is important for the parents to talk to the teacher for the students even though they do not speak Turkish; they say they think the teacher would give more attention to the children whose parents are concerned.

RESULTS AND DISCUSSION

In the research, it is concluded that the main problem is "language problem". The Turkish teachers do not speak Arabic and the Syrian children do not know Turkish; they don't understand each other and so the problems are not solved in time. This situation is reflected in the lesson, so the Syrian students cannot learn what the teacher teaches. Like every student who does cannot learn the lesson, they get bored and distract the other students and the teacher by displaying unwanted behaviors. Moreover, the class teachers do not implement facilitating activities nor bring varied material to class. Similar situations have been seen in the literature. It has been concluded that alien students do not understand their teachers, peers and the environment; they cannot communicate; they cannot express their feelings and thoughts; they do not participate in the lesson; and as a result of all these, they either have lower academic achievement as compared to their peers or frequently become unsuccessful (Güngör and Şenel, 2016). The following data have been reached: In a study related to the problems of the teachers who had refugee students, the main issue is the language problem; participating teachers do not design content for the need of the refugee students; teachers need material for those students; teachers do not develop objective methods in the process of assessment. It is a common idea that a preparatory training should be given to the teachers and refugee students for them to learn the Latin alphabet and Turkish. As a result of the research, it has been determined that teachers require vocational development and assessment aimed at refugee students such as analysis of the teaching content; teaching strategies; teaching aids; development and assessment of measurement material (Bulut et al., 2018; Erdem, 2017). Again the problems that the teachers came across and the themes that emerged according to the results of a study related to solution proposals are academic problems, language and communication problems, social problems and recommendations (Şimşir and Dilmaç, 2018). In another study, the problems that emerged in classes that included Syrian children are gathered under three topics. These have been listed as an obstacle of language, lack of family support, and inefficiency of the teachers to have the refugee students grasp pedagogic skills (Yaşar and Amaç, 2018). A study on the problems of Syrian students in Turkey shows that the students were affected by post-traumatic stress disorder, had difficulty about understanding and communicating the content within the classroom, there were problems that arise due to the fact that the classrooms are overpopulated and teachers were not involved in decision-making processes about these students. Also, teachers are not effectively informed about refugee students as they are not in a credible effort to increase their capacity to cope better with the situation of these students (Tösten et al., 2017: 1149).

In the study, it has been concluded that the Syrian students cannot communicate with their surroundings and fall behind academically due to "the language problem", live through lack of self-confidence and they are exposed to mockery of their classmates because they cannot express themselves properly. In a study related to Syrian students, it was reported that the biggest problem is that they do not speak Turkish and they have rapport problem with their peers; as for the problem the teachers who have Syrian students in their classes face is that they cannot communicate with the Syrian students and they cannot include them in the educational process (Başar et al., 2018; Kiremit et al., 2018). In a study related to the training of the Syrian refugees in the Child Studies Department of İstanbul Bilgi University titled "The Situation of the Syrian Refugee Children at the State Schools" (URL, 2015), it was reported in the interviews with the teachers in the schools that discrimination and isolation were rare; but with the focused groups of students it was reported that there was very limited communication between the Turkish and Syrian students, no friendship experience and the Syrian children were influenced and isolated. Some children said the Turkish students did not play with them, did not believe what they said and did not make friends with them. Most of the children said they were satisfied with their teachers. It was observed that the teachers did not do anything to solve discrimination and isolation in schools. The teachers also stated that the problem of discrimination was related to the parents of the Turkish children. The parents did not want their children to sit with Syrian children, and the teachers said they had difficulty finding a place for the Syrian children to sit. The Syrian children were sitting either with another child or alone. It was observed that the teachers hesitated to take the initiative in this matter. In two different studies with the pre-school students, similar results were found. It was concluded that the level of the Syrian children to know Turkish

played an important role in adapting to school, learning class rules, communicating easily with others and feeling secure (Yanık-Özger and Akansel, 2019; Avcı, 2019). It has been emphasized that in all similar studies, the most fundamental issue is language problem (Çerçi and Canalıcı, 2019; Küçüksüleymanoğlu, 2018; Şahin and Şener, 2019). The studies having been done in this field and the consequences of this study are consistent. The most important problem experienced in a multicultural classroom was the "language problem". The origin of most of the other problems such as academic failure, social and emotional adaptation problems is that they do not speak Turkish and do not understand what they hear.

At the end of the study, the fact that the teachers explain subjects at great length so that the Syrian students can understand and that they even deal with some children individually results in an important problem for the Turkish students. Because this situation slows down the progress of the subjects for the Turkish students, it is understood that it causes them to fall behind academically in comparison with their peers and also leads to unwanted behavior because they get bored. Similar results were found in a study carried out by Özdemir (2018). According to the data of this study with the topic "The Evaluation of the Opinions of the Turkish Students who Receive Education with the Syrian Students under Temporary Protection", a great majority of the participants are unhappy to receive education together with the Syrian students and often fight with them because they cannot communicate with them.

In the entire research, "language problem" appears to be the main problem the Syrian children face. This problem influences the adaptation and academic situations, and the social and emotional developments of the students negatively. After the observations and interviews the prospective teachers suggested that students should certainly learn Turkish before they start school, there should be particularly language courses at school on weekdays and/or weekends, Syrian students should receive education according to the MEB (Ministry of Education) curriculum in separate classes from the Turkish students, teachers should learn Arabic, and Syrian students should attend in GEMs. In addition, if parents come to school and talk to the teachers, it will cause the teachers to pay more attention to the students. In a study related to the problems arising in schools where there are alien students, teachers reported that they try to solve the vocabulary-based language problem by using Google Translate, continuously have the children memorize poetry, visit houses to increase communication and understanding among students and have drama and game activities. Aiming at the solution of the problems they had with the alien students, teachers and administrators have suggested that primarily kindergarten training should be given, there should be language training intended for families and children, they should place them all in the same class not to affect the

other children, and a new unit should be opened within the body of the Office of Education (Sarıtaş et al., 2016). In another study, it was suggested that courses should be arranged for the teachers who have alien students in their classes in the field of Turkish teaching as a second and foreign language; permanent and temporary teachers should be appointed throughout the country to teach Turkish to the students and their families after school hours; counselling should be given to the students by appointing counsellors who speak Arabic and English;

Turkish courses should be designed for the families to have them participate in educational activities; seminars and school activities should be designed for the families to cooperate with the school and have more responsibility in the training of their children; placement tests should be given to the students for them to get appropriate education for their Turkish levels; the students, who cannot start school at the beginning of the term and especially those who are not efficient enough to read and write, should attend the first grade for a period of time or Turkish courses should be designed for them after school; teaching programs for Turkish lessons suitable for the students and orientation programs to school should be developed; more visual material should be provided for the students (Güngör and Şenel, 2018: 166-167). In a similar study, class teachers had the solution to the problems they had with Syrian students: Syrian students should attend separate classes, parents should be given father-mother training; after getting acquainted, classes should be joined and the elder students should attend different classes (Ergen and Şahin, 2019: 377). In this and similar researches it has been concluded that for the education of Syrian students primarily "the language problem" should be solved (Kardeş and Akman, 2018; Sağlam and Kanbur, 2017; Taşkın, 2018; Tunç, 2015; Weddle, 2018). We are of the opinion that the solution of this problem will contribute to the solution of several other problems.

In summary, according to this research, the most important problem experienced by both Syrian and Turkish students and classroom teachers is the problem of language. People who coexist together try to live and learn together without understanding each other. This leads to many academic, emotional and social problems. As a solution, teachers recommend that language courses be held for Syrian children before they begin their lives as a student. Germany is one of the countries that have experienced migration in the past years. During the migration events in Germany in 1980 and 1990, they placed migrant children in separate classes to teach them German as second language, which had significant negative effects on the school and business careers of migrant students. According to European experience from previous migrations, it has been found that taking migrant children into normal classes after teaching basic

language skills is extremely important for socialization, active use of language and integration (Koehler and Schneider, 2019). Migration from Syria is still ongoing. The countries of the world have not developed a regulation to please the parties on the migration issue, to provide appropriate living conditions for Syrians and to bring the education of children to a level close to/equal to the standard of the children of the host country. As a result of the migration events so far, the majority of migrants have not returned to their home countries, even if everything improves. Investment in these children will benefit the host country in the long run (Koehler and Schneider, 2019).

Suggestions

The following suggestions have been introduced according to the results obtained from the research data:

1). Teachers who have alien students in their classes can get training in terms of how to teach in a multi-cultural class.
2). Applied training can be designed for teachers and counsellors to bring these war victim children back to life.
3). Teachers who have a second trauma can be supported by the government
4). Language courses suitable for their age and Turkish level can be started for Syrian children and adults to solve their language problem.
5). The training of "Teaching Turkish as a Foreign Language" can be given to the class teachers who have Syrian students in their classes.
6). Syrian parents can be encouraged to come to school and communicate with the class teachers.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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Affordances for connecting culture and Mathematics: Moving from curriculum to school textbooks

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Researchers have generally agreed that textbooks as a major conveyor of the curriculum play a dominant role in modern education scenes across different school subjects. The study analyzed a set of four learners' textbooks and their corresponding teachers' guides which are used as set books for teaching mathematics at Grade 9 level in South Africa. These textbooks were produced in response to the demands of the Grade R-9 National Curriculum Statement (NCS) policy document. A qualitative content analysis on how the recommendations in the policy document were further recontenxtualised in the pedagogic recontextualising field (PRF) by textbook authors into curriculum materials is presented. A vertical analysis approach was used, attending to the ways in which textbooks treat the idea of indigenous mathematical knowledge. Thus, it checks on the provided affordances for connecting culture and mathematics. Indications of affordances for connecting culture and mathematics are awash in the analyzed textbooks. However, authors had few examples from the learners' indigenous cultures but rich implementation ideas using foreign cultures. There is need for further research on where and how this indigenous mathematical knowledge can be extracted so as to be part of the textbooks' content.

Key words: Indigenous knowledge, culture, affordances, school textbooks.

INTRODUCTION

Mathematics textbooks have a strong ability to influence mathematical learning through influencing classroom practices (Stylianides, 2014; Fan, 2013). Textbooks are designed to assist teachers in structuring their teaching and suggest a pathway for learners to follow when exploring a topic (Johanson, 2005). Textbooks play a significant role in ways mathematics lessons are designed and delivered; their influence over the content of lessons; the instructional approaches; the quality of activities assigned for pupils, in classrooms and for homework; and learning outcomes and achievement (Alajmi, 2012; Törnroos, 2005; Weiss et al., 2003). In the context of curriculum reform, textbooks may be used as a roadmap to the implementation of curriculum change. Robitaille and Travers (1992) argued that a great dependence upon textbooks is perhaps more characteristic of the teaching of mathematics than any other subject. In relation to such importance, Sosniak and

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Perlman (1990) pointed out that the power of textbooks lies in their ability to serve as resources. Textbooks can provide an "organized sequence of ideas and information" to structured teaching and learning, which guide readers' "understanding, thinking, and feeling" as well as "access to knowledge which is personally enriching and politically empowering" (Sosniak and Perlman, 1990: 440). Apple (1986) argued that it is the textbook which establishes so much of the material conditions for teaching and learning in classrooms and often defines what elite and legitimate culture to pass on is. Researchers' conceptualization about the relationship between the textbooks and curriculum is particularly worthy to note. Textbooks, as curriculum materials, offer supplementary ideas for teaching. Howson (1995) pointed out that textbooks were one step nearer classroom reality than a national curriculum.

According to Stylianides (2014), textbooks can be analysed from various perspectives, among others the learners' perspective, the teacher's perspective or a mathematical perspective, thus examining a textbook's potential to aid learning. In this article textbooks were analysed to find out how the textbook writers responded to the demands of South Africa's Grade R-9 National Curriculum Statement (NCS) policy document. The NCS recommends the incorporation of indigenous knowledge in mathematics education.

South Africa has embarked upon a curriculum that strives to enable all learners to achieve their maximum potential (Revised National Curriculum Policy, Department of Education, 2002). Policy statements for Grades R-9 Mathematics envisage learners who will "be culturally and aesthetically sensitive across a range of social contexts" (Department of Education, 2002: 2). In this regard, the curriculum promotes knowledge in local contexts, while being sensitive to global imperatives (Department of Education, 2011). Interestingly, some assessment standards expect learners to be able to solve problems in contexts that may be used to build awareness of social, cultural and environmental issues. The NCS challenges educators to find new and innovative ways to reach learners from diverse cultures in their mathematics classrooms. Valuing indigenous knowledge systems is one of the principles upon which the NCS is based. Part of the teacher's work involves coming to an argument for ethnomathematics as a cultural way of doing mathematics. The NCS calls for radical teaching practice changes on the part of the teachers in order to see mathematics incorporated in the real world as a starting point for mathematical activities in the classroom (Madusise, 2013, 2015). Therefore, for there to be a real possibility of implementing such kind of classroom activity, there is need to investigate the mathematical ideas embedded in cultural practices, ethnic and linguistic communities of the learners. Khisty (1995) argues that learners of all background would benefit from the opportunity to learn about and identify

with their rich mathematics heritage and on-going cultural practices.

METHODOLOGY

Bernstein (1996, 2000) described pedagogic device as a system of rules that regulate the processes by which specialized knowledge is transformed to constitute pedagogic discourse (in the forms of curricula and selected texts). The pedagogic device (Bernstein, 2000) is made up of three fields: the field of knowledge production, the field of recontextualisation, and the field of transmission. Each of these fields operates by a set of rules which inform what knowledge gets privileged, what happens to this knowledge as it is recontenxtualised into curriculum and transmitted through pedagogy and assessment. Of interest to this article is the field of recontextualisation, in this case the academy where certain rules "select and de-locate" (Bernstein, 1990: 185) from the field of knowledge production what counts as educational knowledge. For Bernstein, the movement of knowledge from one site to another occurs through the process of recontextualisation.

Recontextualisation is influenced by two fields; the official recontextualising field (ORF) and the pedagogic recontextualising field (PRF). Through the ORF the state and its delegates (state education agents such as curriculum advisors) operate at a generative level to legitimise official pedagogic discourse (that is the curriculum e.g. the NCS). Therefore any curriculum represents the official pedagogic discourse produced in the official recontextualising field (Bernstein, 1996). In this case knowledge selection from the field of production is also influenced by the political needs of a particular state at a particular time. This undergoes further recontextualisation through the PRF, when policy is interpreted and used as for example in the construction of textbooks or in professional development programmes. Both the curriculum text (official pedagogic discourse) and the textbook or professional development text are recontenxtualised in the reproduction-text at the level of the teacher's pedagogic practice in the classroom.

Specifically the study from which this article is premised analyzed the NCS for Grades R-9 to explore what recommendations are put forward in the policy document concerning the incorporation of indigenous knowledge systems in the teaching and learning of school mathematics (Madusise, 2013). The recommendations were further checked through analyzing a set of four Grade 9 textbooks which Grade 9 teachers were using as set books as well as reference books. The selected Grade 9 textbooks and their accompanying teachers' editions were said to have been developed for the National Curriculum (as indicated on the covers of the textbooks). These textbooks were chosen with the anticipation that they adhere to the goals of the NCS. Affordances for connecting culture and mathematics were checked in the textbooks, checking how the authors managed to move from curriculum statements to school textbooks.

A qualitative method approach involving the descriptive survey research design was used. Qualitative research is contextual and subjective as opposed to generalizable and objective, and as such has generated considerable debate around issues of reliability and validity. However, threats to validity and reliability can never be entirely erased; at best the researcher could strive to minimize invalidity. Reliability, on the other hand, deals with whether the results are consistent with the data collected. It may be useful as an indicator of *trust worthiness* of research results. Reliability simply means dependability, stability, consistency and accuracy as described by Atebe (2008). Validity should then be seen as a matter of degree rather than as an absolute state (Gronlund, 1981). Trustworthiness is established by the researcher's attempts to demonstrate the robustness of the method (Winter, 2000). To

confirm or ensure trustworthiness of the results, the researcher used excerpts from the NCS and textbooks. Excerpts from textbooks were analyzed against excerpts from the NCS checking whether or not they were conforming to the curriculum demands. The 'what' from the curriculum was checked against the 'how' from the textbooks (see the analytical framework).

Analytical framework

The examination of the documents was guided by the 'what' and 'how' questions. The 'what' was attending to the recommendations presented in the documents referring to what content and relations to be transmitted. The 'how' referred to the degree of implementation of the recommendations, that is the form to be taken by the transmission of these contents and relations, examining the control the teachers and pupils possess over the selection, organization, and pacing of cultural mathematical knowledge.

Some official pedagogic discourses explicitly define the 'what to teach", "how to teach" and assessment criteria (strongly framed), giving teachers and learners little control over the selection, sequencing and pacing of the transmission and acquisition (Bernstein, 1996). However, in other official pedagogic discourses, the "what to teach" and "how to teach" are implicit, giving learners more control of what they want to learn. In such a scenario, teachers play the role of facilitators. The analyzed documents were checked against these two dimensions. Bernstein gives primacy to the recontextualising field, seeing it as a mediating context governing the fundamental autonomy of education" (Bernstein, 2000:33). What approach[es] find[s] a place in the classroom will largely rely on the power relations between the official recontextualising field (ORF) and the pedagogic recontextualising field (PRF). Of interest to this article is the checking of these powers and control relations espoused in the ORF and PRF, with respect to the recommendations made in the ORF and how these recommendations were recontenxtualised in the PRF. The vertical analysis approach was used. Mesa (2004) defined vertical analysis as an approach attending to the ways in which textbooks treat a single mathematical concept, that is, how a particular idea or aspect of interest is reflected in the textbooks. The single treated idea in this study was the idea of indigenous mathematical knowledge.

RESULTS AND DISCUSSION

Analysis of the national curriculum statement for Grades R-9: Mathematics

The adoption of the Constitution of the Republic of South Africa (Act 108 of 1996) provided the basis for curriculum transformation and development in South Africa (Department of Education, 2002: 1). One of the aims of the Constitution is to heal the division of the past and establish a society based on democratic values, social justice and fundamental human rights. The development of a new policy is always situated within a particular historical, economic, social and political context (Taylor and King, 1997). This is explicitly so with the NCS. The Manifesto on Values, Education and Democracy (RSA DoE, 2001b) identified strategies which find expression in the NCS to familiarize learners with the Constitution. One of the strategies is 'to learn about the rich diversity of cultures, beliefs and world views within which the unity of South Africa is manifested'.

Valuing indigenous knowledge systems is among the NCS principles. "Indigenous knowledge systems, in the South African context refer to a body of knowledge embedded in African philosophical thinking and social practices that have evolved over thousands of years (Department of Education, 2003:4). Indigenous mathematical knowledge is conceived as part of this political vision. This is because the NCS has infused indigenous knowledge systems in the subject statements as reflected in the learning outcomes and their respective assessment statements. It acknowledges the rich history and heritage of the country as important contributors to nurturing the values contained in the Constitution (Department of Education, 2003: 4) (Table 1). From the above narratives the NCS is advocating for inclusion of indigenous knowledge in the assessment standards. The Grade 9 mathematics learning area has five learning outcomes. Out of these five learning outcomes, the inclusion of indigenous knowledge is argued for in the assessment standards of four learning outcomes. This indicates the importance which is being attached to the value of indigenous knowledge in mathematics education. The NCS can be said to be supporting school mathematics through its history and the various applications of mathematics in different cultures around the world, sending a message that curriculum material developers should seek and include historical elements as well as cultural elements in their texts in order to enrich the teaching of various lessons. This quest and its findings does not only target into enriching the teaching of various lessons, but also in discovering facts and elements that can encourage a deeper understanding of mathematics, how some mathematical ideas evolved, how society influenced their development, how results influenced society as well.

The NCS's assessment approach is in line with D'Ambrosio (1985)'s notion of ethnomathematics. In his seminal paper, D'Ambrosio (ibid) defined ethnomathematics as the bridges that connect historians and anthropologists from one side and mathematicians from the other, in order to identify the different kinds of mathematics that exist. From the above NCS extracts, it can be recognized that the role of mathematics in education is not just to provide pupils with the scientific tools – which are important - but also to answer questions such as "where does mathematics come from?", and "why and how did it come about?", providing the learners with a more understanding of mathematics as a science and as a human endeavour. Therefore, the NCS policy strongly recommends the inclusion of history and culture in the assessment programme for teaching mathematics, thus, providing affordances for connecting culture and mathematics.

Textbook analysis

To analyze the textbooks the method used by Valverde et

Table 1. Extracts of what is proposed in the NCS with respect to indigenous knowledge.

Learning outcomes	Assessment standards
i). Numbers, Operations and Relations: The learner will be able to recognize, describe and represent numbers and their relationships	We know this when the learner: i). Describes and illustrates the historical development of number systems in a variety of historical and cultural contexts (including local)
ii). Patterns, Functions and Algebra: The learner will be able to recognize, describe and represent patterns and relationships, as well as solve problems using algebraic language and skills.	We know this when the learner: i). Investigates, in different ways, a variety of numeric and geometric patterns and relationships by representing them, and by explaining and justifying the rules that generate them (including patterns that are found in natural and cultural forms and patterns in learner's own creation) ii). Constructs mathematical models that represent, describe and provide solutions to problem situations (including problems within human rights, social, economic, cultural and environmental).
iii). Space and Shape (Geometry): The learner will be able to describe and represent characteristics and relationships between two-dimensional shapes and three-dimensional objects in and a variety of orientations and positions.	We know this when the learner: i). Recognises, visualizes and names geometric figures and solids in natural and cultural forms and geometric settings ii). Describes the interrelationships of the properties of geometric figures and solids with justification in contexts hat include those that may be used to build awareness of social, cultural and environmental issues.
iv). Measurement: The learner will be able to use appropriate measuring units, instruments and formulae in a variety of contexts.	We know this when the learner: i). Solves problems – including problems in contexts that may be used to develop awareness of human rights, social economic, cultural and environmental issues – involving known geometric figures and solids in a range of measurement contexts. ii). Describes and illustrates the development of measuring instruments and conventions in different cultures throughout history.

Table 2. Blocks for the vertical analysis of textbooks.

Block to examine	Examples of tasks to examine
Narratives	Use of paragraphs to explain concepts and topics involving cultural knowledge through description and discussion
Exercises and questions	These engage learners more actively than narrative blocks. They provide instructions and opportunities to acquire particular skills
Activity elements	These are segments of textbooks that contain instructions and suggestions for learner activities. Often they contain instruction for conduct of some "hands-on" experiences. Activities prescribe an intended dynamic use of the textbooks and inherently demand an active learner" (Valverde et al., 2002: 142)
Support for teachers	Information to teachers on how to incorporate indigenous knowledge in the teaching and learning of mathematics

al. (2002) was adapted. The content on cultural knowledge selected from the textbooks was divided according to narratives, exercises and questions, and activity elements. These adapted blocks were used as units of analysis (Table 2).

Cultural mathematical ideas within the narratives in the learners' textbooks

To examine cultural knowledge within the narratives in the selected learners' textbooks, the researcher identified and reported on: (a) how mathematical concepts were introduced using cultural knowledge, (b) whether the given history of mathematical concepts was local or foreign, (c) whether different cultures were represented in the narratives, and (d) whether indigenous ideas were explored within different representations such as diagrams, tables and graphs. For ethical reasons, the textbooks were referred to as books 1, 2, 3 and 4 instead of referring to them by title or author's name.

This narrative (Figure 1) provides a brief history on the development of irrational numbers. The failure to calculate the length of the hypotenuse of the right-angled triangle led Hippasus, the Greek mathematician to the concept of irrational numbers. This suggests that
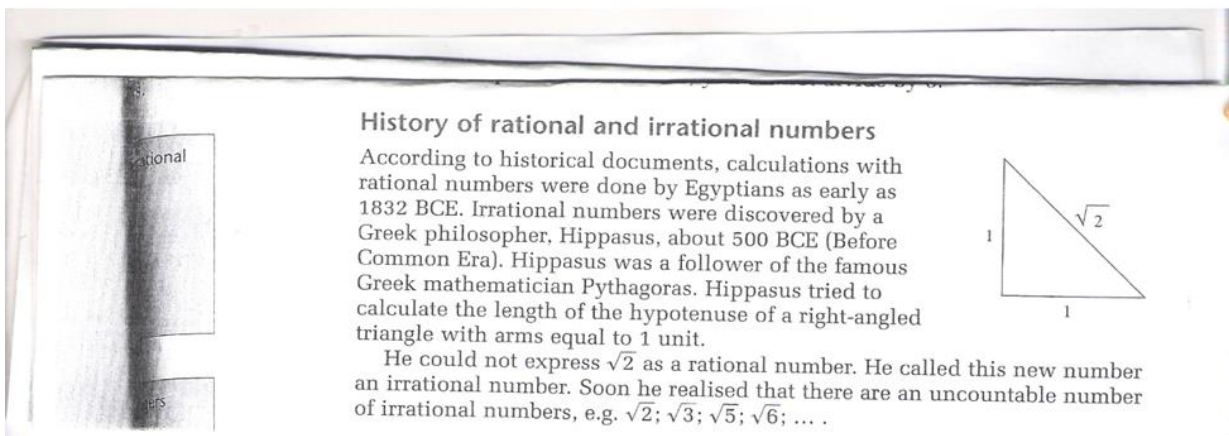
Figure 1. An example of how the development of rational and irrational numbers was introduced in Book 1, page 3.
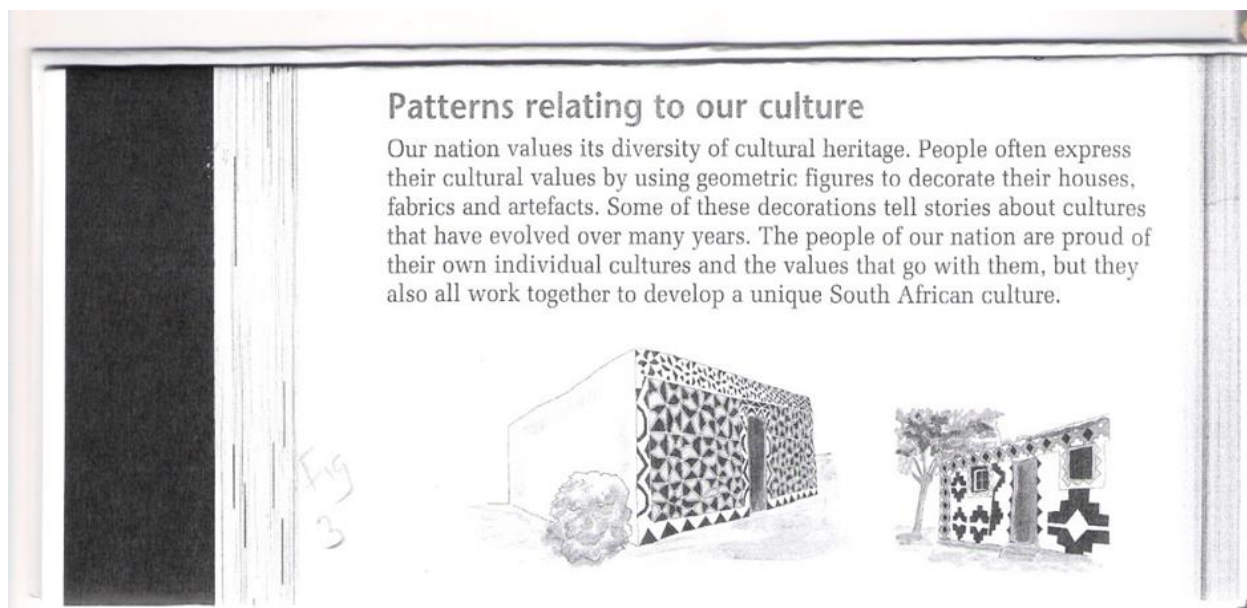
Figure 2. Some geometric figures from Book 1, page 130.

mathematical ideas were developed to solve encountered problems. Generally societal needs led to additional number groups in number systems. This background information helps the learners to realize that mathematics was developed through cultural human activities aimed at solving encountered problems. Figure 2 gives both a narration on how some geometrical figures were used as decorations in the South African cultures and diagrammatic representation of geometric figures. Such decorations can be used to illustrate transformations. This suggests that some mathematical ideas also evolved from the South African cultures, thus making mathematics culture-laden.

It was interesting to note that by citing South African cultures, the authors were suggesting the possibility of some mathematical concepts having evolved from South African cultures. This is in line with one of the NCS's principles – cultural consciousness. However, the same authors were not consistently using South African cultures; a close analysis of the textbook reveals only two situations where South African cultures were cited in all the thirteen cultural narratives used in the textbook.

Figure 3 gives the historical developments of some mathematical concepts in different cultures. This information may help learners to understand that different cultures developed different mathematics and also helps

Figure 3. Narrative statements from Book 2, page 3.

them to realize the connection between culture and mathematics, making mathematics a product of different cultures. This is in line with the NCS's definition that "mathematics is a product of investigation by different cultures". Joseph (1991 quoted in Joseph, 2000) emphasizes the fact that mathematics is usually taught from a purely Euro-centric point of view, focusing on the development of sciences in Europe, as if the rest of the world never contributed. Contributions of the Egyptians and the Babylonians towards the development of mathematics are reflected in the narratives. Although the narratives are suggesting a possibility of mathematics having developed from Africa, narratives from South African cultures, for example, geometry patterns found in

Ndebele paintings and beadings would be more appealing to the local learners. There are also patterns found in the Venda clothes. These could have presented the learners with local cultural knowledge.

Interestingly, it was noted that, in all the four analyzed textbooks, indigenous ideas were explored within different pictorial representations (Table 3). These symbolic and pictorial representations provide opportunities for multiple representations of ideas. Grouws (1992) and Hiebert (1986) cited in Mayer et al. (1995) argue that it is important to help students build connections between multiple representations. Multiple representations of problem-solving procedures might usefully include all symbolic, verbal and visual

Table 3. Representations used in the textbooks.

Textbook number	Type of representation
Book 1	The tower of Hanoi used to illustrate number patterns using golden discs placed on the needle at the centre of the tower, p. 23.
	Diagrams representing the Chokwe Sona sand drawings, p. 29-32.
	Geometric shapes on South African paintings, p. 130.
	Animal pictures demonstrating patterns in the animal world, p. 132-133.
Book 2	Geometric patterns in cave paintings and clay tablets in Babylon, p. 3
	Egyptian pyramids, p. 5
	Geometric patterns in buildings and the mandala Buddhism circular design, p. 142.
Book 3	Polygons in Islamic architecture used to illustrate transformations, p.71
	Photograph of a woman seeing herself in the mirror illustrating reflection, p.63
	Egyptian number symbols, p. 2
Book 4	Symmetrical shapes, p. 136
	Egyptian pyramids with square bases used to demonstrate Pythagoras theorem, p. 271

representations, with content embedded within familiar situations so that the symbolic, verbal and visual representations are interconnected. This need for textbooks to make connections explicit and to support the making of connections through multiple representations is quite satisfied in all the four analyzed learner's textbooks. This also suggests that cultural knowledge has different forms of representations which can be used to assist learners' understanding. Use of pictorial representations promotes observation and analyzing skills advocated in the NCS.

Cultural knowledge within exercises, activities, investigations and summative assessments in learner's books

In analyzing the exercises, activities, investigations and summative assessments the researcher checked on how they can possibly engage learners in mathematics. Also checked were the activities' affordances of learners' learning of cultural mathematical knowledge and the support of the development of skills and values advocated for in the NCS (Figure 4).

An engagement with the task can make learners competent in isometric transformations. The task covers quite adequate knowledge of isometric transformations. Besides the intended work on transformations, the pictorial representation can also be used in teaching congruence of shapes, lines and order of symmetry, and rotational symmetry. Therefore, the architecture can provide a smooth entry into several mathematical concepts. By engaging the architecture, learners can also engage in deep mathematics. Such cultural contexts can enhance the mathematics learning environments.

However, the authors could have diversified and in addition also used similar examples from local cultures,

especially the Ndebele culture whose paintings are quite rich in geometric shapes. This can help to align textbook content to one of the goals of NCS, that of using local culture as demanded by learning outcomes' assessment standards. Doyle (1988) argues that the tasks teachers assign to students influence to a large extent how students come to understand the curriculum domain.

Clearly the activity can engage learners in a deeper understanding of the history of number systems (Figure 5). In working out the activity, learners may learn more about the number symbols in the Egyptian number system and may also come up with number systems of other cultures including their own cultures. Learners may appreciate the idea that even their cultures were capable of developing mathematics. These tasks may influence to a large extent how learners think about the evolution of mathematics. This premises that tasks, most likely chosen from textbooks, influence to a large extent how learners think about mathematics and come to understand its meaning (Pepkin, 2004). Indeed, Henningsen and Stein (1997), cited by Pepkin (2004) argue that:

The tasks in which students engage provide the contexts in which they learn to think about subject matter. Thus, the nature of tasks can potentially influence and structure the way students think and can serve to limit or broaden their views of the subject matter with which they are engaged (p. 525).

The activity also provides an opportunity for learners to learn about mathematics even outside the mathematics classroom since it demands the search for the history of numbers in the learners' cultures. This history can be searched from community elders or from cultural village employees. The acquisition of such knowledge can enable the learner to develop an awareness of the
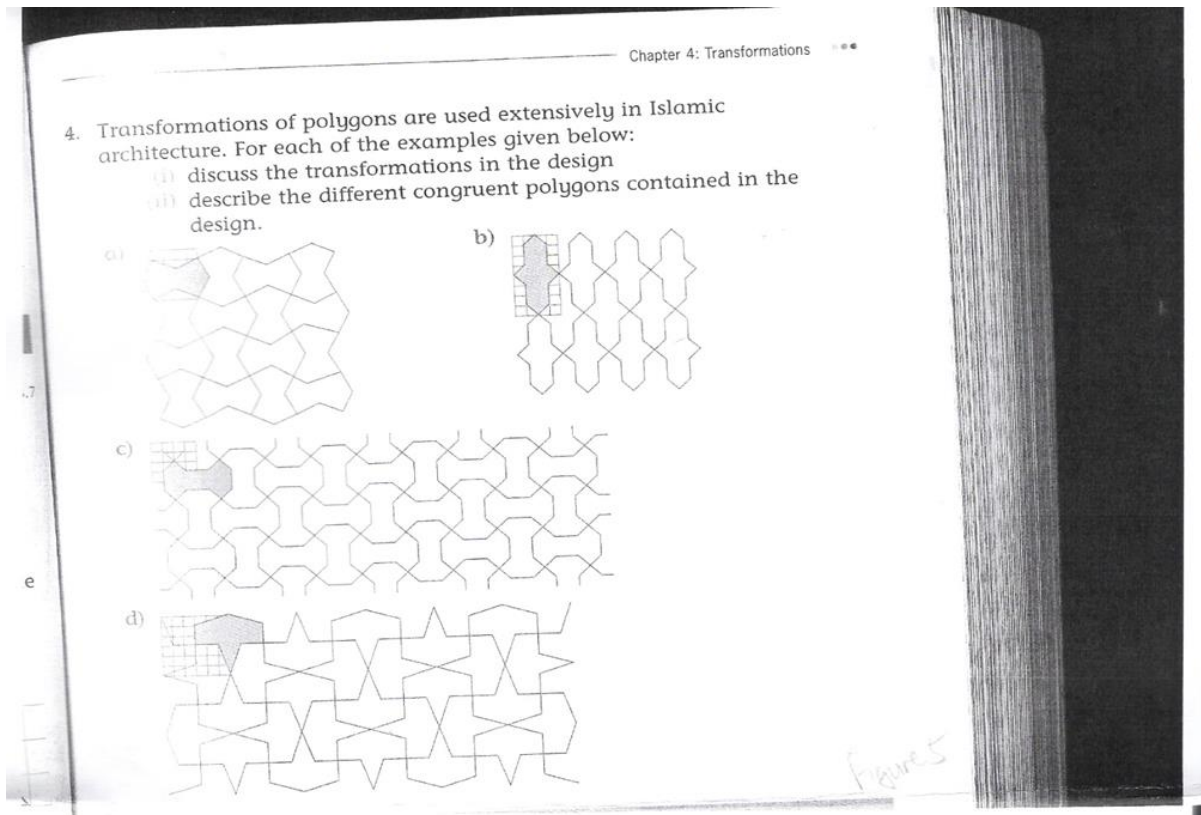
Figure 4. Transformations of polygons in Islamic architecture in Book 3, page 71.

diverse historical, cultural and social practices of Mathematics, thus aligning the teaching and learning of Mathematics with its learning goals outlined in the NCS that of connecting mathematics and culture. Therefore the task can be engaging and motivating for the intended learner population.

In the task, learners are encouraged to work with partners, thus encouraging collaborative work. The task also promotes learner-centred approaches where the teacher's role is that of a facilitator. The task can groom learners for research.

Activity on numbers

Like the other analyzed activities, the above activity can groom learners to be young researchers. Research work can make a measurable difference in the learner's learning where learners are now expected to learn on their own, thus placing the control in the learners' hands. By engaging in the activity, learners can learn more about mathematics in relation to their cultures and in comparison with other cultures (Figure 6).

It was discovered that all the four textbooks have very few questions on local cultural knowledge. Almost all the questions on cultural mathematics in the textbooks had same format. Questions engage learners into some sort

of research on cultural mathematics, thus encouraging learners to talk about mathematics even outside the classroom. For the few presented questions, the selection of instructional knowledge appears to be weakly framed; learners have control over the selection of instructional knowledge. As the activities are sort of projects, learners can work at their own pace. This theory of instruction legitimized in the textbooks provides affordances for connecting culture and mathematics and opportunities for enquiry teaching and learning approaches.

Analysis of teachers' guides

All the teachers' guides for the four analyzed learner's books contain an introduction section where a precise overview of the NCS expectations is provided. In book 3, at the beginning of each learning outcome, a table showing knowledge, skills and values to be promoted is provided. The information on the table reminds and further guides the teachers on the expectation of the NCS. For example the values related to indigenous knowledge under the Learning Outcome, "Numbers, operations and relationships, were:

(i) Appreciate the historical development of number

Figure 5. Activity on number systems: The history of numbers from Book 3, page 2-3.

Figure 6. Activity on the history of numbers from Book 1, page 3.

systems; and
(ii) Appreciate the importance of human rights, social, economic and environmental issues.

However, a further analysis of the supporting content revealed that the content on indigenous mathematical knowledge was left for the teacher and his\her learners' research work. Content given was mainly on the development of number systems in Egypt. The suggested application on the content on local number systems was a class discussion on number systems known by learners. The authors should have made an effort to research on at least one system (and leave the rest for learners' research work) which was used in the local cultures like they did with the Egyptian numbers to show the learners that the number systems in their cultures were also worthy textbook material. This way of presentation when it comes to indigenous knowledge seemed to be the norm in all the analyzed teacher's guides. Where presentations hints on cultural knowledge are given, the authors refer to other nations. This is illustrated by the suggestion such as:

(i) If you have pictures or interesting articles (for example a book with the chapters marked in Roman numerals), bring these to show your learners (Book 2 teacher's guide, p. 5).

The above is a presentation hint on the history of number systems. This sends a message that textbook authors are not well-versed with the local cultural mathematical knowledge since it is not documented. Besides lack of sufficient content on cultural mathematical knowledge evolving from the South African cultures the teachers' guides provide teachers with precise guidelines on possible activities (where the content for activities is made open for further research by teachers and learners) and assessment criteria. The theory of instruction which is legitimized in the guides is mainly weakly framed, suggesting a higher degree of learner's participation.

Conclusion

The analysis of the NCS Grade R-9 Mathematics shows that the curriculum, through its intended content and theory of instruction, creates many opportunities for the integration of indigenous knowledge into school mathematics. The NCS evinces weakly classified inter-discursive relations in terms of integration of indigenous mathematical knowledge. It clearly recommends the use of local cultural knowledge in the teaching and learning of mathematics, promoting the view that mathematics has been or is a human activity which every culture was or is responsible for developing. In response to this view, curriculum statements open up opportunities for contextualising the teaching and learning of mathematics. While there are indications of affordances for

connecting culture and mathematics, lack of sufficient indigenous knowledge content in the textbooks may be detrimental to the successful implementation. The analysis of learners' textbooks and teachers' guides indicates insufficient local cultural mathematical knowledge content but rich implementation ideas using foreign cultures. The usefulness of the suggested implementation ideas depends on the teachers' commitment to go an extra mile searching for the indigenous mathematical knowledge from their learners' cultures.

RECOMMENDATIONS

It looks like there is much to be done, concerning indigenous mathematical content, at the pedagogical recontextualising field for the good ideas proposed by the NCS to be fully realized. This leads to the question; where and how can this indigenous mathematical knowledge be extracted so as to be part of the textbooks' content. In order to provide an answer to this question there is need for further research on cultural sources of indigenous mathematical knowledge. The authors of the analyzed Grade 9 mathematics textbooks seem not to be having sufficient indigenous mathematical content knowledge to incorporate in their textbooks. The frequent cultural content knowledge espoused in the four analyzed sets of textbooks was from the Egyptian, Roman and Babylonian contexts, sending a message that an adequate search of indigenous mathematical content by the authors to include in their textbooks is needed.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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Karl Pearson's chi-square tests

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Statistical tests have been an important tool for interpreting the results of research correctly. The factors that influence the determination of the statistical test are research purpose, hypothesis and data. Today, statistical tests are used more frequently, and they aim to analyze whether statistical tests are used in accordance with research. For this purpose, frequently used chi-square tests are discussed and in this work and the research hypotheses are examined. The method of this research is qualitative and was developed according to the literature review. In the analysis of the data, it explains what the chi-square test is and the differences in practice according to the research hypothesis. In this study, a comparison was made between goodness of fit, homogeneity and independence chi-square tests. In the findings of the study, the differences between the studies using three different tests are presented according to the population and hypothesis. The differences between the studies using three different tests are presented according to the population, hypothesis, and statistical formulas. This area includes definitions in the literature and applications in the field of educational sciences. Simplified definitions and applications that can be adopted by researchers are presented.

Key words: Chi-square test, goodness of fit, independence, homogeneity.

INTRODUCTION

Statistical tests are important for scientific research. Statistical tests to be used in a research affect the comments related to the research results. The biggest problem here is not the theory, but the possibility that a research can change or change the analysis of the data (Black, 1993). The fact that the data selection and the decision process are not taken into account in the analysis are discussed in detail in the article by Gow et al. (2016). The power, reliability, quality, and significance of a scientific study depend on the study process to some extent. Hypothesis and statistical tests of a study may change the inferences from the study. At the same time, they draw attention to the problem of efficiency of the

statistical tests in revealing the truth in the study process depending on their purpose and condition of application. Data analysis is also essential in the study process in addition to statistical tests and hypotheses. Koul (1984) suggests that none of the statistical methods need to be applied unless data analysis and processing are explained and clarified. Scientific studies consist of statistical tests that are made based on categorical and non-categorical data. Such tests are called parametric and non-parametric tests. They help a researcher to analyze the data accurately and significantly. Thus, they are beneficial in summarizing the results in a significant and appropriate way and drawing general conclusions

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(Karagöz, 2010).

In parametric tests, actions are taken based on a parameter, a specific distribution and the concept of variance in the statistics. They are inflexible statistical methods related to population or sample. A parametric statistical test makes an assumption on the population parameters and the distributions where the data are obtained. Accordingly, some assumptions such as suitability of the data to normal distribution, their random selection and quantitative form are based on. Such tests contain Student-t tests and ANOVA test assuming that the data come from a normal distribution.

Non-parametric tests are dealt without being based on population distribution or population parameters. When the word "non-parametric" is used in statistics, it does not mean that nothing is known about the population. This generally means that we know that the population data do not have a normal distribution. A generalization cannot be made based on the results obtained from the hypotheses used in such tests (Gay, 1976). According to Onyango and Odebero (2009) as the population is not known to be normal, sample size is small and the variables expressed as nominal or ordinal.

Non-parametric tests include many tests such as Chi-square, Mann-Whitney U, Sign, Wilcoxon, Median, Kolmogorov-Smirnov and McNemar. Chi-square test is used in discrete data in the form of frequency. It is an independence test and is used to estimate the probability of some non-random factors to take account of the observed correlation. When the literature is examined, similar studies related to the distribution of p-value in small sample size were found in the majority of the studies (Mehotra et al., 2003). Chi-square test shall be taken into consideration in this study. The reason is that this test is commonly used by researchers compared to other non-parametric tests. This study deals with applications of Chi-square test and its use in educational sciences.

Chi-square test

Chi-square test is used to find if there is any correlation among nonnumeric variables that are frequently used in statistical studies (Kothari, 2007). It is symbolized as χ^2. Kothari (2007) stated that the following requirements must be fulfilled before the test.

(i) Observed and expected observations are to be collected randomly.
(ii) All the members (or items) in the sample must be independent.
(iii) None of the groups must contain very few items (less than 10).
(iv) The number of total items must be quite large (at least 50).

The logic of hypothesis testing was first developed by

Karl Pearson (1857-1936) (Magnello, 2005). Chi-square goodness of fit tests, independence tests, and homogeneity tests that were developed by Pearson are the most significant contributions that he made to the modern statistics theory. The significance of Chi-square distribution of Pearson is that statisticians can use statistical methods that do not depend on normal distribution in order to interpret findings. The significance of Chi-square value is determined by using the suitable degree of freedom and degree of significance and consulting a Chi-square table (Moore, 1994). The two special purposes of Chi-square test are to test the hypothesis that there is no correlation among two or more groups, populations or criteria, and to test to what extent the observed data distribution fits to the expected distribution.

Purpose of the study

The purpose of this work is to compare chi-square tests, goodness of fit tests, independence tests and homogeneity tests of Karl Pearson. The difference among these three types of test and each type needs to be examined. Different article samples that were published by using three different test methods are presented. The purpose of this article is to provide a quick general overview of chi-square test.

METHODOLOGY

This study contains collection of current literature, its critical analysis and the data from various sources. Literature analysis that is a qualitative research data collection method is used in this study, and the aim is to do an in-depth analysis of the study problem. Findings obtained by including recent studies on a particular subject in literature reviews are presented under various concepts or themes (Grant and Booth, 2009).

Data collection

Literature review is generally used as a combination of the methodologies in the same study case. Literature review is used and the articles and scientific sources related to the study subject are utilized in this study. In this research, Google scholar and ScienceDirect databases were used in literature review. First of all, the definitions regarding the three different managements and the differences in the steps in the analysis process were revealed by the findings obtained from the literature review. Later, researches developed using chi-square goodness of fit, independence and homogeneity tests were handled according to the purpose, hypothesis and result.

Data analysis

The literature that can be used for systematic evaluation is analyzed by collecting them in different ways in the study. Data analysis is examined and reported as part of the previous literature researches. By this means, the data in the literature are compared,

Table 1. Chi-square tests and attributes.

Chi-square test attribute	Test of independence	Test of homogeneity	Test of goodness of fit
Sampling type	Single dependent sample	Two (or more) independent samples	Sample from population
Interpretation	Association between variables	Difference in proportions	Difference from population
Null hypothesis	No association between Variables	No difference in proportion between groups	No difference in distribution between sample and population

Source: Franke et al. (2012).

examined and synthesized. The factors to be taken into consideration in effective and efficient analysis of the study results by using Karl Pearson Chi-square tests are presented in the study. Definitions of various authors on these tests are examined. Attributes and application areas of chi-square goodness of fit, independence, and homogeneity tests and the conceptual model are also stated. Finally, different studies that were made by using these tests are dealt with.

FINDINGS

In this study, the differences by the purpose and condition of application of chi-square test and the sample analyses are obtained from the studies in the literature. Chi-square test is examined under three titles depending on its purpose and condition of application:

(1) Chi-square goodness of fit test
(2) Chi-square independence test
(3) Chi-square homogeneity test

In Table 1, three different chi-square tests were compared. These tests were examined according to sampling type, interpretation and null hypothesis. In this regard, these distinctions can best be explained by the null hypothesis and sampling type tested in each of these tests. So, interpretation can change depending on these.

Chi-square of goodness of fit test

Chi-square of goodness of fit test is also called *single-sample goodness of fit test* or *Pearson's Chi-square of goodness of fit test*. This test is a single-sample non-parametric test.

(i) Cases (for instance, participants) are obtained from a single categorical variable. For example, "educational background" consisting of two groups: "high school" and "university".
(ii) Distribution is obtained from a known or hypothesized distribution. For example, a known distribution such as the rate of literate and illiterate persons in a country or a

hypothesized distribution such as the rate of men compared to women in the number of participants of the university admission exam in the next year.

While chi-square of goodness of fit test is applied, it is important to "hypothesize" if we can expect the cases in each group of the categorical variable to be "equal" or "unequal". Mutai (2000) suggests that goodness of fit test is far from comparing the data that are empirically derived to the results that are expected theoretically (expected to be frequencies).

In data analysis, it is required to find degrees of freedom, expected frequency counts, test statistics and P value related to the test statistic. Degrees of freedom (DF) are equal to (k) number of minus 1 levels of the categorical variable.

$DF = k - 1$

Expected frequency count is equal to the expected frequency counts at each level of the categorical variables, and the sample size of the rate is hypothesized by using the null hypothesis.

$E_i = np_i$

E_i, is the expected frequency for ith level of the categorical variable, n is the total sample size, and p_i, is the hypothesized rate of the observations at i level. The value of Chi-Square goodness of fit test is calculated by using the formula,

$$X^2 = \left[\frac{(O_i - E_i)^2}{E_i} \right]$$

O_i, is the observed frequency count for ith level of the categorical variable, and E_i, is the expected frequency count for ith level of the categorical variable.

Hypothesis of Chi-square of goodness of fit test is stated thus,

H_0: Data follow a specified distribution.

Table 2. Sample analysis related to chi-square of goodness of fit test.

Aim	H_0 hypothesis	Result
"The constant error of the halo in educational outcomes research" (Pike, 1999)	"Traditional and halo models including both college experience and gain factors were specified and tested" (Pike, 1999)	"The chi-square goodness-of-fit statistic for the traditional model was statistically significant (x^2=1180.25; df =360; p < 0.001)" (Pike, 1999)

Table 3. Sample analysis related to Ci-square test of independency.

Aim	H_0 hypothesis	Result
"In this study, the correlation between the proportional reasoning skill and the ratio and proportion problem posing skill of primary school students is studied" (Çelik and Özdemir, 2011).	"There is no significant correlation between proportional reasoning levels and problem posing skills of the students" (Çelik and Özdemir, 2011).	"Pearson chi-square value is found X^2= 185.63. According to the values p, the value p< 0.05 is obtained, so it is found that there is a significant correlation between proportional reasoning levels and problem posing skills of the students" (Çelik and Özdemir, 2011).

H_1: Data do not follow the specified distribution.

The comment on rejection is that the sample is significantly different from the population by the correlation variable. Table 2 contains a sample study in which a sample related to chi-square of goodness of fit test is compared to a population that has known parameters in a correlation variable.

Chi-square test of independence

It evaluates if some categorical variables are correlated with some populations, because variables tend to be a bit different from their populations. However, it is not probable for the variables in a sample to have a strong correlation if the variables are independent in the whole population. Consequently, we conclude that the variables are probably not independent in the population.

In data analysis, it is required to find degrees of freedom, expected frequencies, test statistics and P value related to the test statistic.

Degree of freedom (DF) is equal to the following:
DF = (r - 1) * (c - 1)
In this formula, r is a variable and c is the level number for the other categorical variable.

Expected frequency counts are calculated separately for each level of a categorical variable at each level of the other categorical variable. According to the formula below, r * c gives the expected frequencies.

$E_{r, c} = (n_r * n_c) / n$

$E_{r, c}$ is the expected frequency number for level r of the variable A and level c of the variable B.
n_r is the total sample observation number at the level r of the variable A.

n_c is the total sample observation number at the level c of the variable B
n is the total sample size.

Test statistic. Test statistic is a chi-square random variable that is defined by the equation below (X^2).

$X^2 = \Sigma [(O_{r, c} - E_{r, c})^2 / E_{r, c}]$

$O_{r, c}$ is the observed frequency number at the level r of the variable A and the level c at the variable B. $E_{r,c}$ is the expected frequency number at the level r of the variable A and the level c of the variable B.

The value P is the observation probability of a sample statistic that is as extreme as test statistic. Test statistic is chi-square, so it is used to evaluate a probability that is related to the test statistics. The degrees of freedom that are calculated above are used in it.

Hypothesis of Chi-square test of independence is stated below.

H_0: Correlation variables are independent.
H_1: Significant variables are correlated.

In Table 3, the hypothesis sentence and the test result related to chi-square test of independence are given. Chi-square test of independence determines if the two categorical variables in a single sample are independent from each other.

Chi-square test of homogeneity

The test is applied to a single categorical variable from two or more different populations. It is used to determine if frequency counts are distributed among different

Table 4. Sample analysis related to chi-square homogeneity test.

Aim	H$_0$ hypothesis	Result
"This relative distribution can be used to test for homogeneity between groups, and the groups having relatively higher distribution are favored by the students to make their decision" (Paul and Smith-Hunter, 2011).	"Drinkers and nondrinkers are not homogeneous" (Paul and Smith-Hunter, 2011).	"Chi-square test of homogeneity shows that these two groups (drinkers and nondrinkers) are not homogeneous in terms of citations" (Paul and Smith-Hunter, 2011).

populations in the same way. The only difference between the independence test and homogeneity test is the specification of null hypothesis. The homogeneity test tests the null hypothesis that claims homogeneity or equality based on some attributes.

Chi-square test of homogeneity is used to determine if two or more independent sample vary by distributions on a single variable. A common use of this test is to compare two or more groups or conditions on a categorical result. Formulation of omnibus test statistic is formed as independence test and homogeneity test. But, although they are the same, there are differences in these two test sampling hypotheses. Hypothesis of Chi-square homogeneity test is stated below.

H$_0$: Distribution of correlation variables is the same.
H$_1$: Distribution of the significant variables is not the same.

In Table 4, chi-square independence test was made in the study, and whether the groups vary by distribution of the significant variable as a result was analyzed.

DISCUSSION

This study emphasizes the definition and different applications of Chi-square test. Applications of chi-square homogeneity, goodness of fit and independence tests are examined in detail. A simplified conceptual model that can be applied in most cases was developed in order to understand different chi-square tests. Although formulations of the omnibus test statistic of chi-square independence and chi-square homogeneity test that are used in many scientific studies are the same, these two tests vary in sampling hypotheses, null hypotheses and the subsequent rejecting options. The main difference between these two tests is the manner of collection and sampling of data. Formulation of chi-square goodness of fit test statistic and its hypothesis are different from others.

Specifically, independence test collects data on a single sample and then compares the two variables in this sample in order to determine the correlation between them. When the data are collected by using only a single sample in chi-square independence test, only independence test is valid. In this test, comments can

be made only on the correlation between the variables.

In homogeneity test, the data from two or more different groups are collected. The two samples are then compared on a single significant variable in order to test if there is any difference between the rates. When the data from two or more samples are collected in chi-square homogeneity test, the homogeneity test is suitable and comparison of rates can be made among multiple groups. Wickens (1989) presents a delicate and concise description of these tests as well as their sampling assumptions and hypotheses. In addition to homogeneity and independence tests, Wickens presents an additional alternative in which both margins are constant 'irrelevant classification test'.

In general, chi-square test is a strong statistics that enables the testing of the hypotheses related to the variables that are measured at nominal level. However, important factors to be considered while using chi-square test should be suitable for the purpose, hypothesis and data of the test. This method is frequently used especially in small sample quantitative research. In this line, the aim and hypothesis of the research should be clearly stated and it is important to make an appropriate analysis.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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Examination of postgraduate theses on string instruments in Turkey

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The amount of scientific researches is increasing steadily. In today's information age, parallel to technological advances, scientific research keeps pace with innovation and development. Recent research in social and humanities sheds light on many innovative approaches and guides. In this study, answers were sought with the help of the document analysis model for answering the "What is the distribution of postgraduate studies on string instruments in Turkey between 1993 and 2019 in terms of years, institute types, permission status, and university variables?" problem statement. With the research, it was intended to determine the frequency and percentage rates of postgraduate studies carried out under the name of "Stringed instruments" in the National Thesis Centre of Higher Education Institution between 1993 and 2019, to obtain answers to "How are the distributions by the university?" "How are the distributions by years?" "How are the distributions by postgraduate thesis type?" and "How is the distribution of the theses made according to the access status?" questions.

Key words: String instruments, string instruments research, string instruments graduate studies, music research, graduate music theses.

INTRODUCTION

Scientific research progresses with the evolution of societies from the past to the present, and it is increasing rapidly day by day. As the diversity of research increases, its contribution to science, art, and social development is advancing at an equal rate. The number of scientific researches is increasing day by day in the country. In today's information age, parallel to technological advances, scientific research keeps pace with innovation and development. Recent studies in social and humanities

shed light on many new approaches and guides.

It can be stated that scientific research arises with requirements such as obtaining solutions to problems encountered in any subject, eliminating a problem, meeting a need in any field. Research is fundamentally a search, making the unknown known (Arlı and Nazik, 2003: 3) and begins with a felt difficulty (Karasar, 2009: 22). Presently, situations like completion of more than one study on the same or similar subjects in the

corresponding fields have started prompting a need against the researches for the evaluation of the studies that have already been completed (Çeşit, 2015: 446). Scientific investigations in the field of music are carried out in related departments of universities, depending on postgraduate programs (Uçan, 1996: 111).

Although there are studies on many subjects, mostly sub-disciplines in various universities, institutes, and majors in the field of music, many scientific studies have been completed with the increase in interdisciplinary studies in recent years. The number of researches is increasing day by day in proportion with the increase in graduate programs. Accordingly, the need to evaluate previously completed studies in a particular area is also observed in music (Çeşit, 2015: 447).

Instrument education is an extremely fundamental dimension of vocational music education, causing positive changes in the individual's education. It brings a disciplined understanding parallel to the discipline brought by music education in his life (Tufan, 1997: 37).

String instruments art and education are a discipline representing two crucial cultural facts together and their artistic and scientific foundations. While the aesthetic concerns about the vocalization of the works form creative goals, the intellectual resource, and the motion techniques that will be effective in the emergence of the required style, the research, development, and application of these reveal the scientific foundations. In terms of scientific and artistic perspectives, research on a string instrument art and education has created its scientific literature with the utilization of scientific reporting techniques. In the scientific reporting tradition, thesis writing symbolizes the start of the scientific literature life for many researchers. Studies in the fields of string instrument art and education, fundamentally in the areas of master's degree, then doctorate and proficiency in art, constitute the first scientific reports of researchers working on these subjects (Tebiş and Okay, 2013: 11).

In this study, answers were sought with the help of the document analysis model for answering the "What is the distribution of postgraduate studies on string instruments in Turkey between 1993-2019 in terms of years, institute types, permission status, and university variables?" problem statement. With the research, it was intended to determine the frequency and percentage rates of postgraduate studies carried out under the name of "Stringed instruments" in the National Thesis Centre of the Higher Education Institution between 1993-2019, to obtain answers to "How are the distributions by university?" "How are the distributions by years?" "How are the distributions by postgraduate thesis type?" and "How is the distribution of the theses made according to the access status?" questions. Besides, providing data for scientific research in string instruments and a source for postgraduate studies in string instruments is intended. The research has sought to reach the data regarding the following sub-objectives:

(i) How is the distribution of the postgraduate studies constituting the sample group by thesis type?
(ii) How is the distribution of the postgraduate studies constituting the sample group by years?
(iii) How is the distribution of the postgraduate studies constituting the sample group by the university?
(iv) How is the distribution of the postgraduate studies constituting the sample group by according to the permit status?
(v) How is the distribution of the postgraduate studies that make up the sample group according to the institute types?

The study is significant in terms of shedding light on other studies in the field of string instruments in terms of the literature. Especially where the graduate studies on string instruments in Turkey are carried out intensively, which universities are performed, which institutions are primarily conducted in which institutes, and in which stages of graduate studies are held. This research,

(i) Assumed that all postgraduate studies on string instruments in Turkey are registered in the Higher Education Institution, National Thesis Centre,
(ii) The method followed in the research is suitable for the solution of research questions,
(iii) The resources and the data obtained for the study are sufficient in the scope of the research.
This research,
(iv) Is limited to postgraduate theses in the Higher Education Institution National Thesis Centre records between 1993-2019,
(v) With the keyword "String Instruments" in the Higher Education Institution National Thesis Centre records,
(vi) Explores directly or indirectly through articles, papers, seminars, postgraduate studies and available resources,
(vii) Although Violin, Viola, Cello and Double bass instruments belong to the stringed instrument family, the keyword "Stringed Instruments" is used only in theses is limited,
(viii) And by the time allocated for research and the financial resources provided by the researcher.

METHODOLOGY

This study aims to examine postgraduate studies about string instruments in Turkey between 1993-2019, in the document analysis model, one of the qualitative research methods. Qualitative research enables the current situation to be studied in depth. It requires trying to understand humans and their behaviour in the environment and in many ways (Karasar, 2009: 77). Document analysis, which is applied as a data collection method in scientific research, is a comprehensive analysis of the published written sources regarding the targeted events. In cases where techniques such as observation, test, and interview cannot be used, they are considered a research method alone. Document analysis is the examination of documents produced in a specific period on a problem situation or materials provided by many sources related to

Table 1. Distribution of theses forming the sample group by thesis type.

Thesis type	f	%
Master's degree	108	68
Doctorate	18	11
Proficiency in art	33	21
Total	**159**	**100**

this problem situation and at various times based on a particular period (Yıldırım and Şimşek, 2013: 217).

Within the research scope, postgraduate studies on string instruments were scanned at the Higher Education Institution, National Thesis Centre using the keyword "string instruments," and 159 postgraduate studies were found. The research population is made in the field of music in Turkey and registered postgraduate studies at the Higher Education Institution National Thesis Centre. The research sample consists of postgraduate studies performed in the string instrument under the subtitle between 1993-2019 registered in the National Thesis Centre of the Higher Education Institution. The sample of the study is considered to represent the population.

The relevant literature, directly or indirectly, was examined to provide data for the research, and the necessary resources were provided for the research. The postgraduate theses conducted under the subtitle of string instruments between 1993-2019 registered in the National Thesis Centre of the Higher Education Institution were searched through the thesis scanning catalogue using the keywords "Stringed Instruments" and "1993-2019". Therefore, 159 postgraduate studies reached were determined to provide data within the scope of the research. During the data collection phase, the research was limited to the keyword "stringed Instruments" and "1993-2019" in scanning the Higher Education Institution National Data Centre. The scope of the research was examined using the keyword "String Instruments" obtained from the Higher Education Institution thesis screening Centre and limited to the years 1993-2019. The 159 postgraduate studies accessed have been grouped according to the thesis type, the years to which it belongs, the types of institutes, the universities to which it has been carried out, and the data obtained are given in tables and frequency and percentage distributions.

RESULTS

According to Table 1, 159 graduate studies were determined as 68% as Master, 21% as Proficiency in Art, and 11% as Doctorate studies. While the study has been completed at the highest level (68%) at the Master level, this rate is at (11%) at the Doctorate level. Therefore, it can be assumed that most of the postgraduate studies scanned with the keyword "string instruments" are carried out at the Master's level.

According to Table 2, it was discovered that between 1993 and 1997, 13% graduate and 3% proficiency in arts postgraduate studies were carried out, while at the doctorate level, there was no postgraduate study. It has been discovered that between 1998-2002, 16% master's degree, 11% doctorate, and 24% art degree graduate studies were done between 2003-2007, 11% master's

degree, 11% doctorate level, and 3% art degree qualification studies were done. Between 2008 and 2012, it was concluded that the highest rates in the distribution of graduate studies by years, including 32% graduate, 44% doctorate, and 52% proficiency in art, were made between them. Between 2013 and 2017, 23% postgraduate, 28% doctorate, 18% postgraduate study findings at the level of proficiency in art was reached. Between 2018-2019, it was determined that there was no postgraduate study at the level of proficiency in art, while 5% postgraduate and 6% doctorate studies were conducted.

According to the findings obtained from Table 2, the highest rate was reached with a total of 60 graduate studies between 2008 and 2012, and the lowest rate was a total of six graduate studies between 2018 and 2019. Accordingly, it can be assumed that the most postgraduate studies at all levels were carried out between 1993-2019, and 2008-2012.

According to Table 3, it is concluded that at least one study has been completed in all universities except for Necmettin Erbakan University and Yaşar University. At the doctorate level, Dokuz Eylül University (11%), Ege University (11%), Gazi University (22%), İnönü University (17%), Istanbul Technical University (11%), Marmara University (22%) and Necmettin Erbakan University (6%) appear to have completed studies. At the Proficiency in Art level, Afyon Kocatepe University (3%), Anadolu University (15%), Dokuz Eylül University (6%), Hacettepe University (15%), Haliç University (3%), Istanbul Technical University (9%), Istanbul University (15%), Mimar Sinan Fine Arts University (22%), Trakya University (9%) and Yaşar University (3%) was found to have completed postgraduate studies.

When Table 3 is analyzed, it is observed that the highest degree of postgraduate studies with 13% at Mimar Sinan Fine Arts University has been completed. Istanbul University is in second place with 11%, and Hacettepe University and Anadolu University are in third place with 10%. It is determined that a small number of graduate studies have been carried out in Afyon, Ankara, Cumhuriyet, Çukurova, Fırat, Kocaeli, Karadeniz Technical, Mersin, Necmettin Erbakan, Pamukkale, Selçuk, Yaşar and Yıldız Technical Universities with a rate of 1%.

According to Table 4, 73% of the postgraduate studies

Table 2. Distribution of theses forming the sample group by years.

Thesis year	Master's degree		Doctorate		Proficiency in Art		Total	
	f	%	f	%	f	%	f	%
1993-1997	14	13	-	-	1	03	15	09
1998 - 2002	17	16	2	11	8	24	27	17
2003-2007	12	11	2	11	1	03	15	09
2008-2012	35	32	8	44	17	52	60	38
2013-2017	25	23	5	28	6	18	36	22
2018-2019	5	05	1	06	-	-	6	04
Total	**108**	**100**	**18**	**100**	**33**	**100**	**159**	**100**

Table 3. Distribution of theses forming the sample group by University.

University name	Master's degree		Doctorate		Proficiency in Art		Total	
	f	%	f	%	f	%	f	%
Abant İzzet Baysal University	5	05	-	-	-	-	5	03
Afyon Kocatepe University	1	01	-	-	1	03	2	01
Anadolu University	11	10	-	-	5	15	16	10
Ankara University	1	01	-	-	-	-	1	01
Atatürk University	3	02	-	-	-	-	3	02
Cumhuriyet University	1	01	-	-	-	-	1	01
Çukurova University	1	01	-	-	-	-	1	01
Dokuz Eylül University	3	03	2	11	2	06	7	04
Ege University	2	02	2	11	-	-	4	02
Fırat University	1	01	-	-	-	-	1	01
Gazi University	4	04	4	22	-	-	8	05
Hacettepe University	12	11	-	-	5	15	17	10
Haliç University	4	04	-	-	1	03	5	03
İnönü University	1	01	3	17	-	-	4	02
Istanbul Technical University	6	05	2	11	3	09	11	07
Istanbul University	13	12	-	-	5	15	18	11
Karadeniz Technical University	1	01	-	-	-	-	1	01
Kocaeli University	1	01	-	-	-	-	1	01
Marmara University	4	04	4	22	-	-	8	05
Mersin University	2	02	-	-	-	-	2	01
Mimar Sinan University of Fine Arts	14	12	-	-	7	22	21	13
Necmettin Erbakan University	-	-	1	06	-	-	1	01
Pamukkale University	1	01	-	-	-	-	1	01
Selcuk University	1	01	-	-	-	-	1	01
Trakya University	10	09	-	-	3	09	13	08
Uludağ University	4	04	-	-	-	-	4	02
Yaşar University	-	-	-	-	1	03	1	01
Yıldız Technical University	1	01	-	-	-	-	1	01
Total	**108**	**100**	**18**	**100**	**33**	**100**	**159**	**100**

are in the permission of Higher Education Institution, 26% are without authority, and 1% are partially authorized (limited). It is observed that 70% of the studies at the Master's level, 83% of the studies at the doctorate level, 76% of the studies at the Proficiency in Art level are authorized. On the other hand, it was concluded that 29% of Master's level studies, 17% of Doctoral level studies, and 21% of Proficiency in Art studies are unauthorized. There are 1% Master's and 3% Proficiency in Art postgraduate studies with limited access. Accordingly, it

Table 4. Distribution of theses in the higher education institution's thesis catalog according to the permission status.

Permit status	Master's degree		Doctorate		Proficiency in art		Total	
	f	%	f	%	F	%	f	%
Permitted	76	70	15	83	25	76	116	73
Without permission	31	29	3	17	7	21	41	26
Restricted	1	01	-	-	1	03	2	01
Total	**108**	**100**	**18**	**100**	**33**	**100**	**159**	**100**

Table 5. Distribution of theses forming the sample group according to institutes.

Institute	Master's degree		Doctorate		Proficiency in art		Total	
	f	%	f	%	f	%	f	%
Institute of Educational Sciences	9	08	10	55	-	-	19	12
Fine Arts Institute	18	17	-	-	4	12	22	14
Institute of Sciences	12	11	3	17	-	-	15	09
Institute of Social Sciences	69	64	5	28	29	88	103	65
Total	**108**	**100**	**18**	**100**	**33**	**100**	**159**	**100**

can be assumed that the Higher Education Institution permits a majority of postgraduate studies on string instruments. And that accessibility to the studies is provided without any restrictions.

From Table 5, the Institute of Social Sciences ranks first with 64% in studies at the Master's level. Then, the Fine Arts Institute with 17%, the Institute of Science with 11%, and the Institute of Educational Sciences with 8% come respectively. It has been discovered that 55% of the graduate studies at the doctoral level are completed in Educational Sciences Institutes, 28% in Social Sciences Institutes, and 17% in Science Institutes. It was discovered that there is no postgraduate study at the Fine Arts Institutes at the Doctorate level. It is concluded that the majority of the postgraduate studies at the Proficiency in Art level (88%) are completed at the Social Sciences Institutes and 12% at the Fine Arts Institutes. Accordingly, it was concluded that most of the postgraduate studies in the field of string instruments (88% Proficiency in Art, 64% Master) were completed within the Institute of Social Sciences. Besides, no postgraduate studies have been carried out in the Fine Arts Institutes at the doctorate level and in the Institute of Science at the Proficiency in Art level.

DISCUSSION

For the research, 159 thesis studies completed in the field of string instruments were examined in terms of thesis type, university, year, institute, and permit status.

(i) When the studies are evaluated as thesis type; it is concluded that the majority of 159 postgraduate studies, which are scanned with the keyword "string Instruments,"

are carried out at the Master's level. In their research, Arıca (2017), Çeşit (2015), Tebiş and Okay (2013), and Sonsel (2018) obtained parallel results with their research. As a result of their study, they concluded that more graduate studies were carried out at the Master level. Yöndem (2015), his study is to examine post-graduate thesis completed on guitar in Turkey. He analyzed a total of 89 theses were investigated in terms of selected research topics, study participants, and methods for analysis. For the selection of the thesis included in this study three criteria were used; first, theses from 1990 (beginning time for first completed theses on guitar topic) to 2013 period, second, reaching the full text of theses, and third permission of author.

(ii) When the studies are evaluated by years; and the conclusion is that 159 studies between 1993-2019 were completed at the highest rate (38%) in 2008-2012. The lowest rate was accomplished in 2018-2019, with a total of 6 graduate studies. Similar results were obtained in the studies of Coşkun et al. (2014), Tebiş and Okay (2013), and the reviews of Çeşit (2015). Stevens and McPherson (2007), "Mapping Music Education Research in Australia" called study on the subject; They examined the studies in the field of music between 1972-2020 in Australia in qualitative and quantitative aspects, and scientific studies in the field of music education, Master's and doctoral dissertations and research articles have been revealed in detail.

(iii) When the studies are evaluated according to the universities; it is observed that the highest rate of studies has been completed at Mimar Sinan Fine Arts University with 13%. It is concluded that at least 1% of graduate studies are completed in Afyon, Ankara, Cumhuriyet, Çukurova, Fırat, Kocaeli, Karadeniz Technical, Mersin,

Necmettin Erbakan, Pamukkale, Selçuk, Yaşar, and Yıldız Technical Universities. Similar results were included in the study of Toptaş (2013). Alueda (2012), "A Preliminary Bibliographical Guide to Doctoral Theses on Music in Nigeria (1990-2010)" in his research on examined the doctoral dissertations about topic of music made in Nigeria between 1990 and 2010 and revealed a research that could guide researchers. Alueda has classified doctoral dissertations on music according to their subjects, contents, educators, artists and composers. As a result of the author's research, it has revealed that the scientific studies carried out include musicology subjects rather than education.

(iv) When the distribution of graduate studies in string instruments under the institutes is evaluated; the majority of the studies (88% Proficiency in Art, 64% Master) are completed within the Institutes of Social Sciences, at the Doctoral level Fine Arts Institutes, and in the Proficiency in Art level at any Institute of Science. It is concluded that no graduate study has been done. Similar results are seen in the studies of Alyörük (2015), Kaptanoğlu and Çanakçı (2015) and Kurtaslan (2018). Parker (2001), Recent "South African Postgraduate Research in Music" in his research on examined the master theses accepted at African universities between 1990-1999. Parker examined the theses made in his study according to theoretical and musicology subjects, and also classified them according to African traditional music and European music.

(v) When considering the results was reached, similar studies can be conducted in other branches of music education in parallel with this study, where the graduate studies undertaken in Turkey are examined using the keyword 'string instruments.'

(vi) Considering that scientific research sheds light on new horizons in science, the information restriction detected in some postgraduate studies can be removed, and information can be shared.

(vii) As can be seen from the results gained from the research, it is achievable to start postgraduate programs lacking in some universities and provide new studies to lead scientific research in Turkey.

(viii) In light of the research results, postgraduate guidance, encouragement, and motivation can be improved for postgraduate studies at the Doctorate level to reduce the numerical shortage of postgraduate studies.

(ix) This study, which comprises the review of postgraduate studies on string instruments can be duplicated, shed light on similar studies, and set an example for other studies in the same format.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Comparison of value acquisitions of children of divorced and non-divorced parents

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This research is a descriptive study aimed at comparing the value acquisitions of children of divorced and non-divorced parents. The study consists of 57,296 children who attended pre-school education in Ankara, in 2018. Of this sample was 54 divorced families and 4-5 year-old children of the same class and of the same socio-economic level and gender, who agreed to work. In order to reveal the compatibility of the data for normal distribution in the statistical analysis, Shapiro Wilks's test was used due to the unit of numbers. The Spearman's correlation coefficient was used in the relationships between data that did not emanate from the normal distribution. When analyzing the differences between the groups, Mann-Whitney U Test was used in cases where the variables did not come from the normal distribution. As a result of the Spearman's correlation coefficient analysis, the relationship between total scores obtained in the forms which applied to families, teachers and children in order to determine the value levels of children in both divorced and non-divorced families, was completely positive. And the scores obtained from teacher-child forms in all children from divorced family, and non-divorced family was significant and positive. As a result of the research, according to the results from the family-child and teacher form, as regards friendship/sharing, honesty, co-operation, respect and responsibility value, the average scores of children from non-divorced families were higher than the average scores of children from divorced families.

Key words: Value, values education, divorced family.

INTRODUCTION

The family is the smallest part of the society; it is an institution based on the principle of equality for satisfaction of social needs and where common needs are met (Aral and Gürsoy, 2000). In Turkish society, family begins with marriage. They are connected and strengthened by kinship and social bonds. Family

members are defined as the basic unit of the society where sexual, psychological, social, cultural and economic needs are met, mostly living in the same house and adapt to the society in which they live (Bulut, 2018; Özgüven, 2001). Mother and father are very important in the early childhood period, which is called the magic years of the individual's life, period in which one's life is shaped (Oktay, 2007). Parents' interest, care and love to children play a complementary and balancing role in the children's development, (Aydın, 2009). In order for children to be cognitive, physically, socially and emotionally healthy and to be beneficial individuals for their community, they need a loving family environment where effective communication is at the forefront (Kalkınç, 2013).

As much as parents take care of their children, another important task is to inform them about the rules, values, roles and culture that covers them, that will help the child to adapt to the society and also help them to live in the society. In this context, it is the family's responsibility to raise the child and make it an individual of the society in which she or he lives. The quality of the parent relationship and most importantly, its continuity is very important in the child's development. Children learn the correct behavioural patterns by modeling their mother and father, as their first teacher (Şenol, 2004). However, in a family environment where one or both parents are missing, it is inevitable for the child to be negatively affected by this situation and behavioural problems to be observed in the child (Attepe, 2010). Even solid, harmonious and balanced families may encounter unexpected and undesirable situations that will take away this system (Şentürk, 2008). In this context, the discomfort in the family can deeply hurt children. Today, as a result of the discomfort in family, the divorce rates increase significantly. According to TÜIK (Turkey Statistical Institute, 2018), while the number of divorced couples in 2017 was 128,411, this number has increased by 10.9% in 2018 to become 448,142 (Türkiye Istatistik Kurumu, 2018). The child's age during the divorce period, and how the child undergoes the divorce process is important. Divorces, which coincide with early childhood, deeply affect the development process of the child. According to Seven (2008), if parents are divorced before the child turns two, they may not experience significant problems in adolescence. However, if children are between the ages of three and five, in adolescence, aggression appears in boys and girls experience aggression as well as failure in school. In addition, the reactions of children to divorce and the divorce effects vary according to children's age, gender, personality characteristics and family structure (Aydın, 2010).

The cognitive functions of children aged 5 and 6 years of non-divorced families were found to be significantly different from children in divorced families in researches. Additionally, it has also been found that children in divorced families felt unhappy and children whose parents are divorced had constant high anger levels, low self-esteem, and high anxiety levels compared to children of non-divorced parents. In non-divorced families, fathers are at least as efficient as the mothers on the child's psychological adjustment; however, it was concluded that in divorced families the effect of fathers on their children diminished considerably compared to non-divorced families and the role of the mother in the child's life was higher (Feyzioğlu and Kuşçuoğlu, 2011; Altuntaş, 2012; Öngider, 2013b). Children who grow up without a father have a tendency to get involved in more antisocial behaviors and crime as well as their psycho-social adjustment, their achievement and behaviour in school, educational achievements are low, and their abilities to interact with others and develop are reduced; meeting with their father, and maintaining their relationship is very important in terms of children's mental health and well-being (Lund, 1987).

Children who often witness the picture of unhappiness in divorced families are negatively affected by this situation. Children who grow up in an unhappy environment also encounter many social, emotional and mental problems (Turan et al. 2007).

Early childhood is the period in which the child's mental and social-emotional development is at the fastest; it is also a critical period in which the core values are gained. The core values gained are transferred to the coming years (Bakan and Şahin, 2018). Values is an abstract concept, as it is not easy to make a universal definition of it. Some of the explanation made emphasizes the social aspect, the individual and some other economic aspects of the concept of "value" which has an effect on the individual's thinking, decision making and behavioural processes. According to Cooper (2014), it refers to things that are good and desirable, principles that are desired and considered as important rules or standards. According to Schaefer (2012), the beautiful things that are desired to be realized, and the invisible moral principles are defined as the criteria that motivate and direct the individual's behavior and affect the individual in the decision-making process.

Values are the principles that affect the individual's thinking and behaviour. Values undertake practically a control mechanism over the individual's behaviour. It inhibits behaviours that are not accepted by the society; thus, individuals provide their own internal control through their value (Maya, 2017; Sapsağlam and Ömeroğlu, 2016). Values have three dimensions: cognitive, affective and behavioural (Rokeach, 1973). Rokeach (1973) divided the values into two groups, viz: purpose and tool values. Purpose values are the desired, intended, core values, which include behaviours that will be used to reach the core values. Another scientist, Schwartz, has studied the literature of many cultures concerning values. As a result of the study, he divided the values into ten value groups taking into consideration the differences along with the basic motivational features. These values

are: Universalism, Achievement, Self-direction, Benevolence, Security, Power, Hedonism, Conformity, Stimulation and Traditionalism (Bardi and Schwartz, 2003). Spranger and others also examined and classified the values in six different groups, viz; scientific (theoretical), aesthetic, economic, political, social and religious values (Güngör, 1993). As can be seen, the classification of the values varies as well as their definitions.

Along with this, values are living elements (Davidov, 2010), children acquire knowledge of values throughout their lives and the first knowledge is gained in the early period. Although this process continues throughout life, families play a big role in the child's values acquisition process. Family environment affects children's moral development and also prepares children for society as an equipped individual with positive value education (Balat and Dağal, 2009; Brownlee et al., 2016). This is more likely to happen in a healthy family environment.

When we look at researches on single-parent children, much focus has been on the following topics: Whether children of single-parent are at psychological risk (Blechman, 1982); the competence and self-esteem of children from single-parent (Pike, 2003); the ways of approaching parents of children from divorced in terms of different cultures (Bilge and Kaufman, 1983); What are the stress and/or protective factors in the adaptation levels of children after divorce (Amato and Keith, 1991; Amato, 1991; Barnes, 1999; Compas and Williams, 1990; Guttmann and Rosenberg, 2003; Kelly and Emery, 2003; Rodgers and Rose, 2002); the effects of divorce on the child (Öngider, 2013); self-esteem and anxiety levels (Bulut-Serin and Öztürk, 2007; Öngider, 2016); anger levels and anger expression styles (Fiyakalı, 2008); father deprivation and anxiety levels in children (Özdal and Aral, 2005); the relationship between self-esteem and anxiety levels in children (Öztürk, 2006); anger levels and anger expression styles (Çivitci et al., 2009); the relationship between cognitive distortions and self-value (Kuyucu, 2007); the relationship between resilience, coping, self-esteem and psychological symptoms (Kurt, 2013; Kuyucu, 2007), and no research is done on the value levels of children from divorced family.

In line with these researches, when the literature on divorced and non-divorced families and values is examined, it is clear that the value of education given in a healthy family environment improves the moral judgment of the individual, brings values such as truth, honesty, justice and teaches the individual to take social responsibility. The quality and continuity of the parents' relationships are important in the child's development. Children are the most affected in broken families. It is inevitable for this situation to affect their level of value. Based on these opinions, this study aimed to compare the levels of responsibility, respect, co-operation, honesty, friendship and sharing value of children from divorced and non-divorced parents according to the

teacher, family and child forms.

METHODS

Research model

This research is a descriptive study aimed at comparing the value acquisitions of children from divorced and non-divorced parents who attend preschool education institutions. The screening model describes a situation that exists in the past or present as it is, It is a research approach in which the characteristics of the participants' interests, skills, abilities, attitudes, values under focus are determined (Karasar, 1984).

Scope, sample and study group

The scope of the research consists of children aged 4 and 5 years of 54 divorced families who have agreed to participate among 57,296 children, who attend public and private preschool institutions educations, in the 2017-2018 academic year in Ankara Province and 54 non-divorced families of the same class, socio-economic level and gender. The study group consists of children of 54 divorced families and children of 54 non-divorced families who accept to participate in the research, which is in contradiction with the purposive sampling method selected by random sampling.

Data collection

The "Family Information Form" developed by the researcher and the teacher and Child Form of the Preschool Values Scale" developed by Neslitürk and Çeliköz (2015) were used in the research.

Family ınformation form: Developed by the researcher, and questions consisting of the age, gender, number of siblings, birth order, age of the father and mother, educational status of the father and mother, and socio-economic level of the family were included in the form.

Preschool values scale: The Family and Teacher Form is a Likert-style scale consisting of a total of 30 items and including positive and negative items. There are three options in accordance with frequency of showing behaviour in the created items, viz: yes, sometimes, and no. The options and scoring of the scale are as follows: 1 - Yes; 2 - Sometimes; and 3 - No. Reverse scoring was made for the negative items. The scale was prepared in a way to measure the values of respect, responsibility, honesty, co-operation, sharing, and friendship. The reliability of the Family Form of the preschool value scale was examined according to the internal consistency coefficient. The reliability coefficient was calculated as 0.89 according to the 0.84 Cronbach's alpha reliability results of the family form based on the splitting test method. The reliability coefficient of the teacher on the Preschool Values Scale according to the splitting test method was 0.86, and according to the result of the Cronbach's alpha reliability, it was found to be 0.91. The form" Child Form of the Preschool Value Scale" which was visually prepared for children consists of 18 different pictures. There is a coding list in the prepared form, and 18 different short stories occur in the coding table. Children were asked short questions by showing the pictures and telling these short stories. 0-1-2 scores were given in the scoring section in accordance with the answers given by the children.

Table 1. Spearman correlation coefficient analysis from the teacher, family and child forms, conducted to determine the relationship between the scores of the children of non-divorced family.

Variable	1	2	3
Total score of the family form	1		
Total score of the teacher form	0.239	1	
Total score of the child form	0.236	**0.932****	1

Table 2. Spearman correlation coefficient analysis conducted to determine the relationship between the scores of children of the divorced family from teacher, family and child forms.

Variable	1	2	3
Total score of the family form	1		
Total score of the teacher form	**0.321***	1	
Total score of the child form	**0.385***	**0.939****	1

Data processing and analysis

Firstly, descriptive statistics related to the demographic characteristics as to the sample of the research were calculated. In order to reveal the compatibility of the data for the normal distribution in the statistical analysis, Shapiro Wilks's test was used due to the unit of numbers. The Spearman's correlation coefficient was used in the relationships between the data that did not come from the normal distribution. When analyzing the differences between the groups, Mann-Whitney U Test was used in case where the variables did not come from the normal distribution. When interpreting the results of the data, 0.05 was used as the level of significance, and it was stated that there is a significant relationship when p<0.05, but no significant relationship exists when p>0.05. The data obtained in the study were analyzed with SPSS 20' package' program.

RESULTS

The results here were obtained based on the demographic characteristics of the research sample, which comprises the distribution of children by gender (45.37% girls and 54.63% boys). When looking at the distribution of the number of siblings, 53.7% of the children do not have siblings, whereas 46.3% of them have siblings. Looking at the birth order, 70.37% were first child, 7.41% were the middle child, while 22.22% were the last child. Considering educational status of their mothers, 16.67% had primary education, 48.15% had high school education, 8.33% had associate graduate degrees, 23.15% had undergraduate degrees, while 3.7% had graduate degrees. As for their fathers, it was observed that 20.37% had primary school education, 48.15% had high school education, 11.11% had associate degrees, and 16.67% had undergraduate degrees. As regards socio-economic level, 50% of the families were in the low income group, 49.07% were in the middle income group, and 0.93% were in the high income group. With regard to family structure, 50% of

families are nuclear families, 2.78% are extended families, while 47.22% are single-parent families. It was observed that in the divorced families, 88.89% of children live with the mother while 11.11% live with the father. Concerning distribution of ages, it was seen that the children aged between 4 and 5 years; the fathers of children of the non-divorced families included in the study were between the ages of 26 to 52 years, and average age of fathers is 35.93 years; whereas the fathers of the children of the divorced families was between the ages 23 to 51 years, and their average age was 35.46 years. As for the mothers, it was determined that, the mothers of the children of the non-divorced families included in the study were between 25-47 years, and their average was 32.96 years; whereas the mothers of children of the divorced families were between the ages of 20 - 43 years and their average age was 32.46 years.

Table 1 shows the results of the Spearman's correlation coefficient analysis from the teacher, family and child forms, conducted to determine the relationship between scores of the children of non-divorced family.

As can be seen in the table, the forms of children of non-divorced family showed a significant positive relationship from a statistical perspective between the teacher form and the child form scores at the level of p<0.05. Although it was not significant in all other scales, a positive' correlation was found among themselves in a low level.

Table 2 shows the results of the Spearman's correlation coefficient analysis conducted to determine the relationship between the scores acquired from the children of the divorced Family, Teacher, Family and Child Forms. Here in this table, a statistically positive meaningful relationship was found between the family, teacher form and the child forms at the level of p<0.05.

Table 3 shows the results of the Mann-Whitney U Test regarding the difference between the children of the non-

Table 3. Mann-Whitney U test results regarding the difference between the children of the divorced and non-divorced families according to the children's form.

Child form		N	$\bar{x}$	Median	Min	Max	ss	Rank O.	z	P
			Statistical parameters					**Mann Whitney U Test**		
Responsibility	Non-divorced	54	5.43	6	2	6	0.92	60.64		
	Divorced	54	4.93	5	0	6	1.29	48.36	-2.231	0.026
	Total	108	5.18	6	0	6	1.14			
Respect	Non-divorced	54	4.7	5	2	6	1.16	60.5		
	Divorced	54	4.15	4	1	6	1.39	48.5	-2.049	0.04
	Total	108	4.43	5	1	6	1.31			
Cooperation	Non -divorced	54	5.22	6	3	6	0.96	59.6		
	Divorced	54	4.89	5	2	6	1.04	49.4	-1.797	0.072
	Total	108	5.06	5	2	6	1.01			
Honesty	Non-divorced	54	5.11	5	2	6	1.09	62.94		
	Divorced	54	4.5	5	1	6	1.21	46.06	-2.923	0.003
	Total	108	4.81	5	1	6	1.19			
Friendship	Non-divorced	54	5.2	6	1	6	1.09	60.38		
	Divorced	54	4.7	5	2	6	1.3	48.62	-2.071	0.038
	Total	108	4.95	5	1	6	1.22			
Sharing	Non-divorced	54	4.5	4	1	6	1.18	59.44		
	Divorced	54	4.11	4	1	6	1.14	49.56	-1.698	0.089
	Total	108	4.31	4	1	6	1.17			
Total score	Non-divorced	54	30.17	31	18	36	4.06	64.75		
	Divorced	54	27.28	28.5	18	35	4.6	44.25	-3.415	0.001
	Total	108	28.72	30	18	36	4.56			

divorced and divorced families according to the child's form. Here the analyses reveals that while the average score in relation to responsibility value of children of the non-divorced family was 5.43, the average score of children of the divorced family was found to be 4.93 (z = -2.2231; p = 0.026; p <0.05). It was revealed that the scores of children of the non-divorced family were higher enough to make a significant difference from the scores of the children of the divorced family (p<0.05). While the average score in relation to respect value of children of the non-divorced family was 4.7, the average score of children of the divorced family was found to be 4.15 (z = -2.049; p = 0.04; p<0.05). Also, the scores of children of the non-divorced family were high enough to make a significant difference from those of children of the divorced family (p <0.05). While the average score in relation to cooperation of children of the non-divorced family was 5.22, that of children of the divorced family was found to be 4.89 (z = -1.779; p = 0.072; p>0.05). The scores of children of the non-divorced family did not show any statistically significant difference from those of

children of the divorced family (p>0.05). While the average score of children of non-divorced family in relation to honesty value was 5.11, that of children of the divorced family was found to be 4.5 (z = -2.923; p = 0.003; p <0.05). Thus, no statistically significant difference was observed between the scores of children from non-divorced family and those of children from divorced family (p> 0.05). Whereas the average score of children from non-divorced family in relation to friendship/value was 5.2, that of children of the divorced family was found to be 4.7 (z = -2.071; p = 0.038; p<0.05). This therefore revealed that the scores of children of the non-divorced family were high enough to make a significant difference from those of children of the divorced family (p<0.05). While the average score of children of the non-divorced family in relation to sharing value was 4.5, that of children of the divorced family was 4.11 (z = -1.669; p = 0.089; p>0.05). There is no statistically significant difference between the scores of children from non-divorced family and those of children from divorced family (p> 0.05). Furthermore, whereas the

Table 4. The Mann-Whitney U test results related to the difference between children of the non-divorced and divorced families according to the family form.

Family form		N	$\bar{x}$	Median	Min	Max	ss	Rank O.	z	P
				Statistical parameters				**Mann Whitney U Test**		
Responsibility	Non-divorced	54	6.93	7	2	9	1.78	63.46		
	Divorced	54	6.07	6	3	10	1.61	45.54	-3.027	0.002
	Total	108	6.5	7	2	10	1.74			
Respect	Non-divorced	54	7.15	8	2	10	1.91	60.44		
	Divorced	54	6.48	7	2	9	1.67	48.56	-2.002	0.045
	Total	108	6.81	7	2	10	1.81			
Cooperation	Non-divorced	54	7.78	8	4	9	1.08	60.18		
	Divorced	54	7.22	7.5	4	10	1.49	48.82	-1.949	0.051
	Total	108	7.5	8	4	10	1.32			
Honesty	Non-divorced	54	8.43	8	4	10	1.38	59.57		
	Divorced	54	7.85	8	4	10	1.61	49.43	-1.728	0.084
	Total	108	8.14	8	4	10	1.52			
Friendship	Non-divorced	54	9.3	10	7	10	0.88	62.15		
	Divorced	54	8.61	9	4	10	1.42	46.85	-2.686	0.007
	Total	108	8.95	9	4	10	1.23			
Sharing	Non-divorced	54	8.3	9	1	10	1.86	63.86		
	Divorced	54	7.35	8	2	10	1.83	45.14	-3.162	0.002
	Total	108	7.82	8	1	10	1.9			
Total score	Non-divorced	54	47.87	49	32	56	5.47	65.51		
	Divorced	54	43.59	44.5	30	55	6.2	43.49	-3.663	0.001
	Total	108	45.73	46	30	56	6.2			

average score of children of non-divorced family in relation to the total score in the child's form was 30.17, that of children from divorced family was found to be 27.28 (z = -3.415; p = 0.001; p<0.05). It was revealed that the total scores of children of the non-divorced family were significantly higher than the total scores of children of the divorced family (p <0.05).

Table 4 shows the results of the Mann-Whitney U Test in relation to the difference between children from non-divorced and divorced families according to the family form. From the analyses made, while the average score of children of non-divorced family in relation to responsibility value was 6.93, that of the divorced family was 6.07 (z = -3.027; p = 0.002; p<0.05). It was also revealed that the scores of children of the non-divorced family were significantly higher enough compared to those of children of the divorced family (p <0.05). It was observed that while the average score of children from non-divorced family in relation to respect value was 7.15, that of the divorced family children was 6.48 (z = -2.002; p = 0.045; p<0.05). Also, the scores of the non-divorced

family children were significantly high enough to make a significant difference from those of the divorced family children (p <0.05). Whereas the average score of children of the non-divorced family in relation to cooperation value was 7.78, that of children of the divorced family was seen to be 7.22 (z = -1.949; p = 0.051; p>0.05). There was no significant difference from a statistical level between the scores of children of the non-divorced family and those of children of the divorced family (p>0.05). While the average score of children of the non-divorced family in relation to honesty value was 8.43, that of children of the divorced family was found to be 7.85 (z = -1.728; p = 0.084; p>0.05). There was no significant difference from a statistical level between the scores of children from non-divorced family and those of children from divorced family (p> 0.05). Also, while the average score of non-divorced family children in relation to friendship value was 9.3, those of children from divorced family was 8.61 (z = -2.668; p = 0.007; p<0.05). It was revealed that the scores of children from non-divorced family were high enough to make a significant difference from those of children from

Table 5. The Mann Whitney U test results related to the difference between children from non- divorced and divorced families according to the teacher form.

Teacher form		N	$\bar{x}$	Median	Min	Max	Ss	Rank Order	z	P
			Statistical parameters					**Mann Whitney U Test**		
Responsibility	Non-divorced	54	8.35	8	4	10	1.48	66.51		
	Divorced	54	7	7	3	10	1.78	42.49	-4.049	0.001
	Total	108	7.68	8	3	10	1.77			
Respect	Non-divorced	54	8.37	9	3	10	1.74	61.23		
	Divorced	54	7.65	8	3	10	1.84	47.77	-2.279	0.023
	Total	108	8.01	8.5	3	10	1.82			
Cooperation	Non-divorced	54	8.7	9	4	10	1.63	61.15		
	Divorced	54	7.98	8	4	10	1.9	47.85	-2.274	0.023
	Total	108	8.34	9	4	10	1.8			
Honesty	Non-divorced	54	7.15	7	4	10	1.66	60.23		
	Divorced	54	6.46	6.5	2	10	1.61	48.77	-1.934	0.053
	Total	108	6.81	7	2	10	1.67			
friendship	Non-divorced	54	9.07	10	6	10	1.2	61.47		
	Divorced	54	8.43	9	5	10	1.54	47.53	-2.421	0.015
	Total	108	8.75	9	5	10	1.41			
Sharing	Non-divorced	54	8.78	9	4	10	1.56	62.78		
	Non-divorced	54	7.72	8	3	10	2.06	46.22	-2.842	0.004
	Total	108	8.25	9	3	10	1.9			
Total score	Non-divorced	54	50.43	51.5	30	60	6.63	66.8		
	Divorced	54	45.24	47	29	57	7.09	42.2	-4.086	0.001
	Total	108	47.83	49	29	60	7.32			

divorced family (p <0.05). While the average score of children from non-divorced family in relation to sharing value was 8.3, that of children from divorced family was 7.35 (z = -2.668; p = 0.002; p>0.05). There is no level of statistically significant difference between the scores of children from non-divorced family and those of children from divorced family (p>0.05). While the average score of children of non-divorced family in relation to the total score of the family form was 47.87, that of children of the divorced family was found to be 43.59 (z = -3.666; p = 0.001; p<0.05). It was revealed that the total scores of children of the non-divorced family were significantly higher than that of children of the divorced family (p <0.05).

Table 5 shows the results of the Mann-Whitney U Test in relation to the difference between children from non-divorced and divorced families according to the teacher form. From the analysis made, while the average score of children of the non-divorced family in relation to responsibility value was 8.35, that of children of the

divorced family children was 7 (z = -4.049; p = 0.001; p<0.05). It was revealed that the scores of children of the non-divorced family were high enough to make a significant difference from those of children from divorced family (p <0.05). While the average score of children of the non-divorced family in relation to respect value was 8.37, that of children of the divorced family was 7.65 (z = -2.279; p = 0.023; p<0.05). It was revealed that the scores of children of the non-divorced family were high enough to make a significant difference from those of children of the divorced family (p <0.05). While the average score of children of the non-divorced family in relation to cooperation value was 8.7, that of children of the divorced family was 7.98 (z = -2,274; p = 0,023; p <0.05). It was revealed that the scores of children of the non-divorced family were high enough to make a significant difference from those of children of the divorced family (p <0.05). While the average score of children of the non-divorced family in relation to honesty value was 7.15, that of children of the divorced family

was 6.46 (z = -1.934; p = 0.053; p>0.05). It was revealed that the scores of children of the non-divorced family were high enough to make a significant difference from those of children of the divorced family (p <0.05). While the average score of children of the non-divorced family in relation to friendship value was 9.07, that of children of the divorced family was found to be 8.43 (z = -2.421; p = 0.015; p<0.05). It was revealed that the scores of children of the non-divorced family were high enough to make a significant difference from the scores of children of the divorced family (p <0.05). While the average score of children of the non-divorced family in relation to sharing value was 8.78, that of children of the divorced family was found to be 7.72 (z = -2.842; p = 0.004; p>0.05). It was revealed that the scores of children of the non-divorced family were high enough to make a significant difference from those of children of the divorced family (p <0.05). While the average score of children of the non-divorced family in relation to the total score of the teacher form was 50.43, that of children of the divorced family was found to be 45.24 (z = -4.086; p = 0.001; p<0.05). Thus, the scores of children of the non-divorced family were found to be high enough to make significant difference from those of children of the divorced family (p <0.05).

DISCUSSION

From the results of the reseach aimed at comparing the value acquisitions of children of the divorced and non-divorced parents who attend preschool education institutions, it was found that the gender distribution is balanced and half of the children are siblings. The children are mostly first child, and their mothers and fathers are mostly high school graduates. The socio-economic levels of the families are low and medium. The majority of the divorced families live with one parent and mother. And the children's father average age was 35.93 years while that of the mother was 35.46 years. From the Spearman correlation coefficient analysis, the relationship between total scores obtained in the forms which applied to families, teachers and children in order to determine the value levels of children from both divorced and non-divorced family was completely positive and in all divorced family children. And in children of the non-divorced family, the scores obtained from the teacher-child forms were significant. From this aspect, it was concluded that the data obtained in different sources concerning children were consistent with the value scores of the Child Form: responsibility, respect, cooperation, honesty and friendship; the Family Form: responsibility, respect, friendship/sharing; and the Teachers' Form: responsibility, respect, co-operation, friendship, sharing used in the research; and the value levels of children of the divorced family in the total scores of all scales were lower than the value levels of children from the non-

divorced family. According to Freud, the personality of individuals develops witihin the first years of their lives (Aydoğan et al., 2015). The effects of the individual's experiences in early childhood period last a lifetime. The basic values gained during this period will directly affect their future lives. When we look at the values that can be gained, according to Sapsağlam (2017), children aged 3, 4 and 5 years can perceive the "responsibility" value positively; and according to Alpöge (2011) and Dinç (2011), values such as self-respect, self-control, responsibility, co-operation, love, respect, honesty and patience can be gained for children in preschool period. Also, values that can be given in the pre-school period includes: respect, responsibility, happiness, co-operation, patience and honesty values (Balat and Balaban Dağal, 2009). According to Uyanık Balat vd. (2011), parents listed the universal values they want their children to have as honesty, responsibility, respect, happiness, justice, compassion and reliability, being a good citizen and peace. As can be seen in the researches, the value acquisition is easily realized in this period. The value acquisition of individuals first begins by modeling in their family and develops with the experience gained from the environment (Yeşil and Aydın, 2007). It is not impossible to change the habits acquired in the family environment in the following years, but it is very difficult. For this reason, parents are very important because they leave traces that are difficult to remove in the child's personality. It is revealed that the value acquisitions, which is also an indicator of social emotional development, are negatively affected in children from the divorced family. In line with the research findings, Özdemir et al. (2006b) and Sağlam (2011), children from divorced families were more adversely affected than parents and they feel the negative effects of the divorce in their later lives. In the study conducted by Er and Bartan (2019), problems such as turning away from social environment, inability to express themselves, fear, anxiety, aggressive behaviours, aggressivity, irritability, introversion and shyness and distraction were observed in children from single-parent family. Lengua et al. (2000) found that children from divorced parents have more social adjustment problems than children from non-divorced parents, and are also more prone to violence and depression. In a research conducted by Wallerstein and Kelly, it was found that children under the age of five had visible fear, behavioral regression, sleep disorder, aggression and fear of being abandoned shortly after the divorce. They stated that one of three of the same children were unsuccessful and unhappy after 5 years (Moore and Hotch, 1982; Sağlam, 2011). According to Şentürk (2006), the child who moves away from the father and mother due to breakup of the parents, feels helpless, lonely and unprotected. Depending on the intensity of the problems experienced after the divorce, children lose the possibility of obtaining psycho-social support, which will ensure the positive development of

their life. According to researches, it is stated that children from divorced families have problems in terms of socio-emotional characteristics, social adjustment, anxiety, aggression, and peer communication. The value acquisition begins in a happy family atmosphere. The child firstly learns the values such as respect, friendship, honesty, love/being loved, kindness, co-operation, and responsibility from their family. If the child's family environment and life is problematic, the acquisition of values will be negatively affected. A child who grows up in a loveless and unhappy family environment should not be expected to gain this value. In the multiple evaluation done in this research, results of the child, family and teacher form supports both the research and the body of literrature.

Suggestıons

In accordance with these results, an experimental research can be conducted to increase the value levels of children by preparing educational programs relating to value education in schools for children from divorced family. Educational programs relating to divorced parents can be prepared to look at changes in children's value levels. It can also be appropriate to examine how the child's living with the mother or father affects the value acquisition. With a wider group, the factors affecting value levels and value acquisition levels can be identified. It might also be necessary to investigate whether divorce affects children's gender and whether other variables also affect children's value acquisitions. Finally, researches can be conducted to determine if there is any difference in the academic skills of children from divorced and non-divorced families.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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A proposed comprehensive model of 'Value-Creation University' and Transformational indicators of Higher Education in Iran

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Today, most high education experts consider value creation (a term different from entrepreneurship or entrepreneur) as a condition necessary for the survival and development of universities and higher education systems. In this era of advanced technologies and knowledge-based industries in global, regional, national and even local economies, universities can only cope with current widespread crises by strengthening their relationship with industries. The purpose of this study is to design a 'Value-Creation university' model with emphasis on indicators of higher education system. Mixed method (combination of exploratory plan and taxonomy development plan) was applied in this study terms of purpose and implementation. The statistical population consisted of two qualitative and quantitative groups. For the qualitative group, 15 individuals were selected from academic experts and professors in Golestan Province while for the quantitative group 140 individuals were selected from the staff of Ali Abad Katoul University. The selected sample volume based on Morgan's formula was 103. Sampling in the present study was judgmental or purposive at the first stage and simple at the second stage. The research tool used was a questionnaire. Data analysis was done manually in the qualitative part using Grounded method (open-axis-selective coding) while for the quantitative part structural equation method was used together with SPSS and Amos software. The results show that (1) interventionist conditions with focus on the indicators of higher education system, that is, structural component, have a positive effect on the central category, (2) central category has a positive effect on the encouragement, financial and pragmatic strategies, (3) strategies have positive impact on individual and social outcomes, (4) intra-organizational platforms have positive impact on central category and (5) the causal category, namely the indicators of the value creation in universities and the evolution of the higher education system, has a positive effect on the central category.

Key words: Value Creation, University, evolution indicators, higher education system, Ali Abad Katoul, Iran.

INTRODUCTION

In the third millennium, "value creation" can be described as one of the most important engines of growth and development. Promoting value creation is not only necessary for economic health, but is also a criterion for maintaining and developing new jobs (Allan, 2007).

The establishment of universities that create work and value helps to transform a country and its economy into an innovation-based economy, increasing its global competitiveness and improving its quality of life (Zosa, 2013). A university that creates value is an incubator that

strives to simultaneously carry out its missions (teaching, research and value-creation activities) and creates enough space for the academic community to identify creative ideas and visions in order to turn into new investments (John and Michael, 2002; Kirby et al, 2011).

The first university-derived organizations originated from the famous universities of MIT and Stanford. During the last 20 years, the number of universities involved in the training of undergraduate students has increased eightfold; it got to 200 universities, and the volume of copyrights has quadrupled (Talebi et al., 2008).

Today, different societies are seeking to improve solutions of value-creation revolution and a community of value-creation (Martínez-Argüelles et al., 2010; Clark et al., 1984). These communities have planned a special place for the value-creation concept and process, transforming of ideas to wealth (value) chains and providing comprehensive support for value creators and owners of new ideas (Kuratko, 2005; Muscio, 2010). According to recent studies in this field, collaboration between the three sectors of industry, academia and government is needed to promote national and local value-creation system (Philpott et al., 2011). Of these three factors, universities have a more prominent role than the other three sectors because of their mission to provide latest knowledge and techniques. Accordingly, the mission of universities has evolved during the time of global developments in order to meet the expediential needs of societies, and is moving towards participating in the value creation paradigm (Etzkowitz and Leedsdorf, 2000). Universities can, based on the corresponding executive approaches and structures, be described with one of the following three characteristics: first generation (education-based), second generation (research-oriented), and third or advanced generation (Value-Creation University, Value-Creation and Innovator). The systematic transformation of the academic institution from first generation to higher generation has been a spiraling process and the research and production of knowledge is now a key pillar for the realization of the third generation or Value-Creation University (Habibi Rezaei and Siah Mansouri, 2012).

A university that creates value is a university in which scientific inventions can produce the force needed for economic growth and competition in global markets (Mitchell and Chesteen, 1995; Kuratko, 2005). It is necessary to create innovative activities by establishing universities that create value. If such universities do not exist, the results of scientific research would be useless; they would just be stored in academic repositories and libraries, which rarely become innovative activities, products and services (Behzadi et al., 2014). Scholars such as Clark (1998) and Ropke (1998) focused on the

value-creation characteristics of the university (Mitchell and Chesteen, 1995; Kuratko, 2005). Ropke (1998) considers the factors that influence the value-creation characteristics of universities that create value: having value-creation management practices, value-creation members, and value-creation exchanges in the environment. Etzkowitz (2001, 2000) considers the close relationships between industry, government and university as key elements and factors that influence universities that create value; they have linking structures, knowledge and modernization (Yadollahi Farsi et al., 2012). Collaboration between academia and industry is becoming an important issue because it can lead to mutual benefits for all partners involved and the entire community (Muscio, 2010). Interaction can take various forms, both direct and indirect mechanisms (Gender and Wagner, 2008), which in most recent time is called "academic interaction" (Parkman et al., 2018).

Today, if universities all over the globe do not become agents of innovation just like the universities that create value, they will disrupt national and regional development as well as international competition. Over the past ten years, universities have been struggling with a variety of issues, such as globalization and internationalization of higher education, student population growth, financial constraints, and recently financial and economic crises (Samadi et al, 2016). Indeed, value-creation is a process that requires planning in the education and research system and it expands its programs from the family and school to universities and organizations. Additionally it empowers individuals with the expertise and power of creativity, opportunities and abilities. Therefore, in this study, a model for designing universities that create value was formed based on the indicators of higher education system development in Iran. The indicators of higher education system are based on comparative studies of 8 countries selected such as educational and research system indicators, international interaction, members of faculty, administrative and educational force, economic and financial force, graduates and other indicators. Furthermore, the indicators of the higher education system, according to the Cultural Revolution Council, are in the area of macro and micro evaluation including general, educational, research, student and cultural sections and credentials and facilities in quantitative and qualitative terms.

Masoumzadeh and Ansari (2009) have shown in their research that some of the requirements for transforming a traditional university to the one that creates value are (1) overview of organizational structure (financing supply structure - administrative structure - supportive departments), (2) value-creation culture, (3) laws and policies and (4) local economy development. Clark et al.,

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(1998), after a longitudinal study of some European universities in the mid-1990s (this study is considered a turning point in the literature of universities that create value), identified 5 factors as indicators of universities that create value: (1) strong command center, (2) extensive development, (3) diverse funding, (4) academic dynamic, and (5) a value-creation culture. Various studies and researches have confirmed that universities are required to make the necessary changes in their structural, managerial and cultural dimensions universities and in the infrastructures required for them to transit to universities that create value. They themselves provide the basis for more recent works within the Entrepreneurship University framework. For example, Fischerr et al. (2019) showed that developing countries have a particular dynamic for academic entrepreneurship. To promote academic entrepreneurship, universities are still going through specific strategies to become entrepreneurs. Therefore, research activity is not higher levels of academic entrepreneurship.

Academic entrepreneurship is also shaped by the exogenous elements of the University. Dalmarco et al. (2018) also indicated that inventors are cited as important dimensions of entrepreneurship promotion, but the quality of entrepreneurship education, in addition to its close relevance to applied research, encourages academicians to pursue their career plans to startups. In addition, the results of the research by Sidrat and Fricka (2018) showed that to become an entrepreneur university, internal transformations must take place. In this sense, the role of the manager and the type of university has a positive impact on the development of entrepreneur university. Franco and Hass (2015) also showed in their study that collaboration of university and industry is promoted by (1) motivation of researchers (including financial resources, acquiring up-to-date knowledge and technology, practical application of research results, access to job opportunities) and (2) interactive channels (workshops, seminars and conferences, local authorities and specialized associations as mediator, teaching and research, contractual and collaborative research projects, professional and academic workplace.

Jameson and Edonell (2015), Graham (2014), Walshok and Shapiro (2014) and Ketikidis (2012) identified the components of an entrepreneur university and provided a model for it. The results of the study by Shabanpour and Badri (2019) showed that in academic value-creation results the university benefits from the industry and the industry also benefits from the university scientific services, ultimately leading to the creation of employment and economic growth in a country. The results of Mortezaei et al. (2018) showed that in the creation of knowledge-based economy, there are four components in the organizational structure dimension. The results also showed that of all the components giving comprehensive attention to innovation in the university had the highest rate of importance; the informal decision-making

component had the least rate of importance. The other components were in the next ranks, respectively.

Khosravi and Roshani (2017) claimed that the role of universities has changed based on their new responsibilities against the changing society such as national economy, social development, reduction of public finances and the education market. Obviously, universities and higher education system are more in harmony with the indigenous, regional and international economic development process. These universities have shifted their traditional role to knowledge production in the form of entrepreneurial universities and transformed them into action. Universities that have technological innovation and transform these technologies into business, creating employment for graduates and society via these technologies are named third-generation universities. Third-generation universities are entrepreneurs, value-creation, and wealth-creating universties (Habibi Rezaei and Siah Mansouri, 2012). Mansoori et al. (2018) showed that Iranian western universities are not good entrepreneurs in terms of applying software programs and hardware tools. Moreover, it was found that the move to entrepreneurial university requires fundamental changes in software and hard dimensions. The changes of course content, the use of entrepreneurship professors, and communication with industry are among the suggestions that lead to the transformation of any university into an entrepreneurial one. Abedi et al. (2017), in a data analysis, showed that organizational relationships, teaching-learning, curriculum planning, and differences between one Agricultural Value-Creation University, one Natural Resources Value-Creation University and Value-Creation University in the other fields' processes and activities are some of the components that make up a Value-Creation University in the fields of agriculture and natural resources. There was a significant relationship between the two components of strategy and process. From the viewpoint of Pouratashi and Pizhizkar (2017), value-creation competencies can be studied based on the constituents of value-creation competences, predictors of value-creation competences, and outcomes of value-creation competences.

Based on the results, the graduates' value-creation competencies are grouped into six groups: individual and cognitive competence, communication competence, leadership and teamwork competence, business establishment and management competence, economic and marketing competence, and research competence. The university mission was considered as a predictor of value creation in three categories: education, research, and support. Afterwards, value creation intentions emerged as the outcome of value competencies. Samadi et al. (2016), using the fuzzy inference test for research hypotheses, investigated the dimensions and indicators of the universities that create value including vision and mission, university governance and administration, organizational structure and design, multidisciplinary,

power of influence, management of stakeholder, graduates, knowledge transfer, growth and financing center, internationalization, value creation training. They found that none of the indicators were in good situation and all assumptions were poor to accept the hypothesis. Today, the universities that create value link economic development as a new academic practice to education and research.

According to the study of indices done in a university that creates value and the research done in and outside of Iran, the researcher aims to measure the indices and characteristics of universities that create value (Third Generation Universities). These indices studied in this research are educational system, research, international interaction, faculty, administrative, educational and economic-financial force, and graduates as indicators of the country's higher education system for value-creation universities across the country. Therefore, this study seeks to answer the question: what model can be designed and explained for the universities that create value, with emphasis on the evolving indicators of the higher education system?

International higher education challenges

Universities, certainly as one of the most complex institutions, have grown and developed, from the golden decade of the 1960s in many countries around the world (both in Europe and in North America in particular) and have become elements with community credibility, both publicly and privately. Although the number of students has increased tenfold today compared to a century ago, the credibility of universities is declining. In a seminar held in Switzerland in 1998, six basic challenges of universities were considered (Jamshidi Koohsari, 2009) which were: (1) changing environment, (2) missions, (3) student education, (4) higher education funding and (5) department of university affairs.

The administration of higher education institutions, especially research-based universities, is probably the most important and complex issue in higher education policy. The current trend of participatory governance, rooted in North American and Western European universities, works well in a steady state or at a time of increasing resources, but has obvious shortcomings in times of pressure or limitation and rapid change.

History of value creation in Iranian universities

Our country, in the last few years, attended to the issue of value creation, and prior to that, except for a few special cases, there has been almost no history of activity in this regard. Unfortunately, many officials, people, and even the educated and university professors have misunderstood and misinterpreted value creation. The term, which is a seductive translation of the word

entrepreneurship, means job creation or employment, while value-creation has a broader and more valuable meaning than the aforementioned interpretation. This misconception of value creation, as well as the inflation of unemployed manpower in society (especially among University graduates), has led to much focus on many of the policies adopted, programs developed, directives and speeches of officials in this regard, which most of them having economical aspects. Even in Iran universities, which ought to be at the forefront of developing value creation in the true sense of the word and which ought to have proper orientation of views and perceptions in this issue, unfortunately has this unpleasant problem.

METHODOLOGICAL APPROACH

Mixed method (combination of exploratory and taxonomy development plan) was used in this study in terms of purpose and implementation. The statistical population of the study consisted of two groups (qualitative and quantitative groups). In the qualitative part (the first stage), the first statistical sample was all academic experts including adjunct and full-time professors of Islamic Azad Universities in Golestan Province. Sampling was done from which Theoretical Saturation was obtained. At the second stage, the statistical sample was 140 employees in Ali Abad Katoul University; the number obtained by the Morgan's formula was 103. The sampling method was judgmental or purposive in the qualitative part and simple random in the quantitative part. In the qualitative method, data were analyzed by Grounded model (open-axis-selective coding) manually and in the quantitative part Smirnov-Kolmogorov test was used to assess the normality of the research data. The study hypothesis was tested using the SPSS and Amos software and structural equation method was used for modeling. Structural equation method and Amos software were used to analyze the data. For this purpose, the analytical model designed by Amos software was measured.

After conducting the qualitative studies, we proceeded to the quantitative analysis of the research model and the information obtained from the statistical sample of this study, which was University staff. 37.9% of the respondents were females and 62.1% were males. The mean age of most of the respondents (57.2%) was 30-40 years and 1% of the respondents is in the age group of over 50 years. Based on the level of education, majority of the respondents (68.9%) had a bachelor's degree and minority (1%) had a PhD degree. The most frequency in terms of work experience was 49.5% for individuals with 5 to 10 years of work experience and 1% for those over 20 years of work experience with the least frequency.

Methodological principles and processes

This study was conducted using qualitative and quantitative methods and the results were analyzed in two parts. In the qualitative part, interviews were first conducted with experts in the universities of Golestan Province. After data collection via interviews, data were coded and data analysis was performed in three stages (open-axis-selective coding).

Step one, namely, open coding is the first level of coding and involves several stages: extracting data from the interviews, coding, discovering categories. The analysis method of key points was used to extract data from interviews. In this method, instead of coding individual words, key points are identified and coded.

Category discovery

At this point, the concepts themselves are categorized based on the relevance to similar topics, referred to as categorization. The topics we assign to categories are more abstract than the concepts that make up the set of these categories. Categories have high conceptual power because they can aggregate concepts on their own axis.

Step two, namely, axial coding is the second level of coding. This stage involves specifying patterns in the data and the level of categorization and requires permanent comparison of the data. In this study, the coded data and the extracted concepts in the previous step were compared and included in a table in the form of clusters and categories fitting together. To this end, each of the first level codes and concepts were compared with the other first level codes to ensure that the categories were distinct. New data are simultaneously compared to all data to find correlation between them. In this step, we bring together new data and examine the relationship between categories. In this step, the data are oriented and classified according to the nature of the categories and the relationship between them.

Axial coding components are central category, causal conditions, dominant context, intervening conditions, strategies and consequences. The relation of the other categories to the central category is shaped by a paradigm pattern.

Methodology tools

The research tools in the qualitative and quantitative parts were semi-structured interview and questionnaire, respectively. The questionnaire consisted of 6 components (strategies, outcomes, contexts, axial, causal, and intervener) and 63 items in a five-point Likert scale. The scoring method was very high (5), high (4), medium (3), low (2) and very low (1). Content validity and face validity of the questionnaire were approved by the supervisor and advisor professors. The reliability of the questionnaire was above 0.70 in all cases, indicating that the questionnaire had an appropriate reliability.

FINDINGS

All categories are first classified in general and according to the fields studied and then in the form of 6 main columns including central categories, contexts, consequences, intervening conditions, causality and strategies. Since the number of categories is not only abundant but also sometimes similar and intermittent, re-coding operations of the final core category have been performed again, and a more limited and abstract number of categories have been extracted. Then, the category of the final core, that is, the most abstract conceptual level, has been selected again so that it can include all the aforementioned categories and also have an analytical feature. Finally, the final background model is drawn around the core category according to Figure 1. As shown in Figure 1, the concepts obtained from the previous step, in this step, by repeated review and study and the iterative process between concepts and categories, the relationship between concepts and categories in this study was expressed in a paradigmatic pattern in six categories.

Step three as selective coding step is the third step in the analysis of the contextual theory. The selective term is used at this stage because the analyst clearly chooses a central aspect of the data as the core category and focuses on it. Therefore, in selective coding, the same techniques used in axial and open ones will be used (but at a higher level of abstraction). Selective coding is not just a simple description of the data but also analytically centralizes to the data.

Table 1 shows the values Goodness Fit Index (GFI), Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI) and Comparative Fit Index (CFI) for the suggested model in Figure 2. In Figure 2, the research-designed analytical model is evaluated by Amos software and while presenting the model output of this software, we express the optimal criteria of this model based on the obtained data. In Table 1, the confirmatory factor analysis of the questionnaire constructs has a good fit and the questionnaire constructs appropriately represent the relevant variables and relationship between proposed model variables (Table 2).

DISCUSSION

In response to the main question "does the conceptual research model fit well?", the research results showed that the model designed in this study has a good fit and the questionnaire constructs can well explain and show the relevant variables, namely, GFI, NFI, RFI, IFI and CFI. Regression coefficients also showed that the conditions of intervener, that is, structural component, had a positive impact on the central category, namely the 'value-creation university', based on the indicators of higher education system. Central category had a positive impact on the encouragement, financial and operative strategies and as such the strategies positively influenced the individual and social outcomes. Intra-organizational contexts had a positive impact on the central category and the causal category, namely value-creation University indicators and the evolution of higher education system positively influences the central category.

In general, given the flexibility in allocating resources to different parts of the university, it is hoped that a university will be able to make the right financial decisions and measures in different situations and put them on its agenda. Partial branching and sometimes incorrect branching lead to classical management and non-use of lower-level ideas and suggestions. Therefore, what becomes important in this case is the existence of a presidency that has a participatory perspective and can accept suggestions, as stated at the end of the paper.

The results obtained in this research are in line with the results of Fischer et al. (2019), Dalmarco et al. (2018), Franco and Hass (2015), Jameson and Edonel (2015), Graham (2014), Walshok and Shapiro, 2014; Ketikidis,
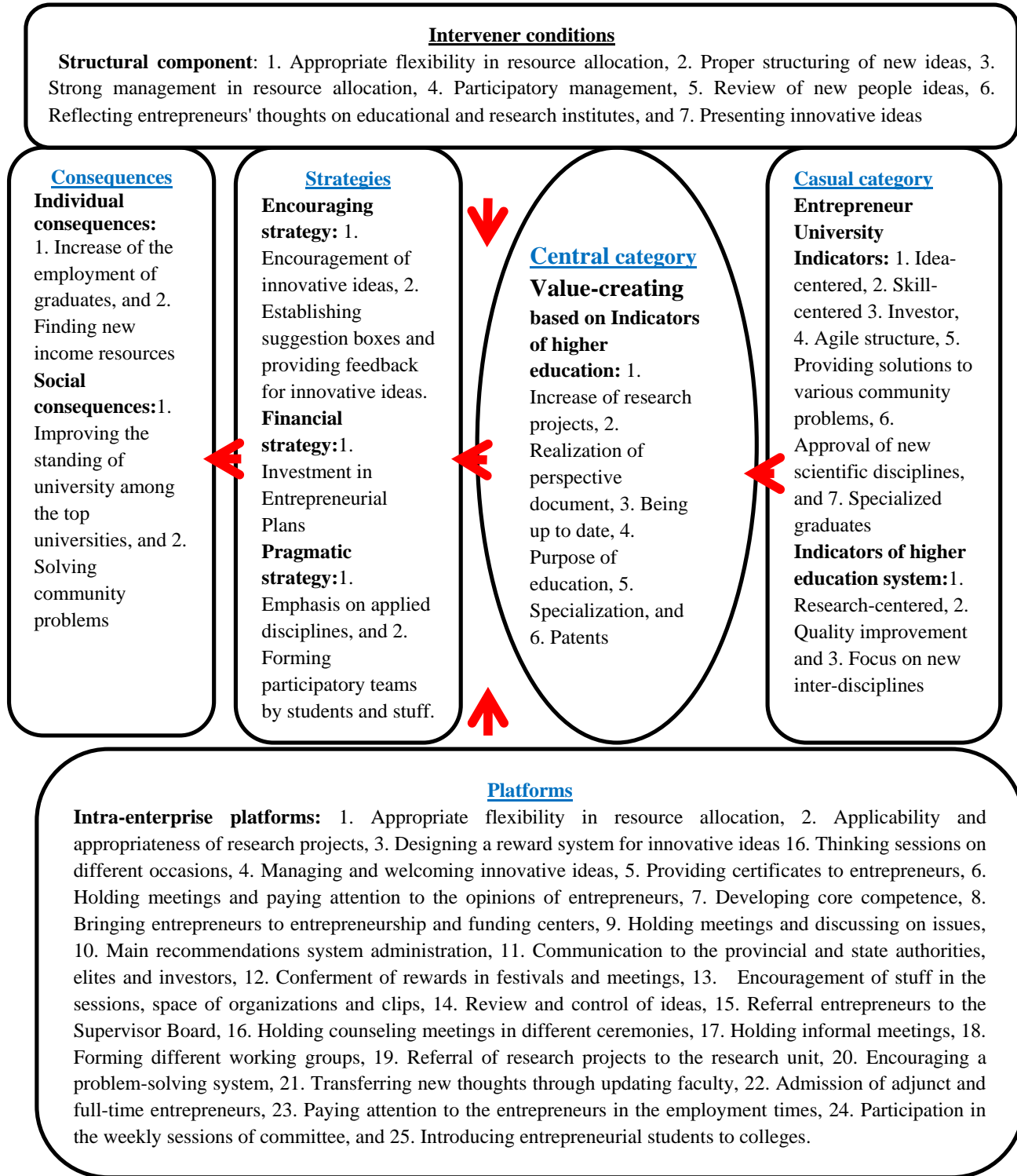
Intervener conditions
     Structural component: 1. Appropriate flexibility in resource allocation, 2. Proper structuring of new ideas, 3. Strong management in resource allocation, 4. Participatory management, 5. Review of new people ideas, 6. Reflecting entrepreneurs' thoughts on educational and research institutes, and 7. Presenting innovative ideas

Consequences
Individual consequences:
1. Increase of the employment of graduates, and 2. Finding new income resources
Social consequences: 1. Improving the standing of university among the top universities, and 2. Solving community problems

Strategies
Encouraging strategy: 1. Encouragement of innovative ideas, 2. Establishing suggestion boxes and providing feedback for innovative ideas.
Financial strategy: 1. Investment in Entrepreneurial Plans
Pragmatic strategy: 1. Emphasis on applied disciplines, and 2. Forming participatory teams by students and stuff.

Central category
Value-creating based on Indicators of higher education: 1. Increase of research projects, 2. Realization of perspective document, 3. Being up to date, 4. Purpose of education, 5. Specialization, and 6. Patents

Casual category
Entrepreneur University Indicators: 1. Idea-centered, 2. Skill-centered 3. Investor, 4. Agile structure, 5. Providing solutions to various community problems, 6. Approval of new scientific disciplines, and 7. Specialized graduates
Indicators of higher education system: 1. Research-centered, 2. Quality improvement and 3. Focus on new inter-disciplines

Platforms
     Intra-enterprise platforms: 1. Appropriate flexibility in resource allocation, 2. Applicability and appropriateness of research projects, 3. Designing a reward system for innovative ideas 16. Thinking sessions on different occasions, 4. Managing and welcoming innovative ideas, 5. Providing certificates to entrepreneurs, 6. Holding meetings and paying attention to the opinions of entrepreneurs, 7. Developing core competence, 8. Bringing entrepreneurs to entrepreneurship and funding centers, 9. Holding meetings and discussing on issues, 10. Main recommendations system administration, 11. Communication to the provincial and state authorities, elites and investors, 12. Conferment of rewards in festivals and meetings, 13. Encouragement of stuff in the sessions, space of organizations and clips, 14. Review and control of ideas, 15. Referral entrepreneurs to the Supervisor Board, 16. Holding counseling meetings in different ceremonies, 17. Holding informal meetings, 18. Forming different working groups, 19. Referral of research projects to the research unit, 20. Encouraging a problem-solving system, 21. Transferring new thoughts through updating faculty, 22. Admission of adjunct and full-time entrepreneurs, 23. Paying attention to the entrepreneurs in the employment times, 24. Participation in the weekly sessions of committee, and 25. Introducing entrepreneurial students to colleges.

Figure 1. Entrepreneur University model design based on higher education system.

(2012), Shabanpour and Badri (2019), Mortezaei al. (2018), Khosravi Pour and Roshani (2017), Sa'adi et al. (2017), Abedi et al. (2017), Pouratashi and Parhizkar (2017) and Samadi et al. (2016).

SUGGESTIONS

According to the results obtained from the qualitative and quantitative parts of this study, it is suggested that special

Table 1. Fitting indicators of the measurement model.

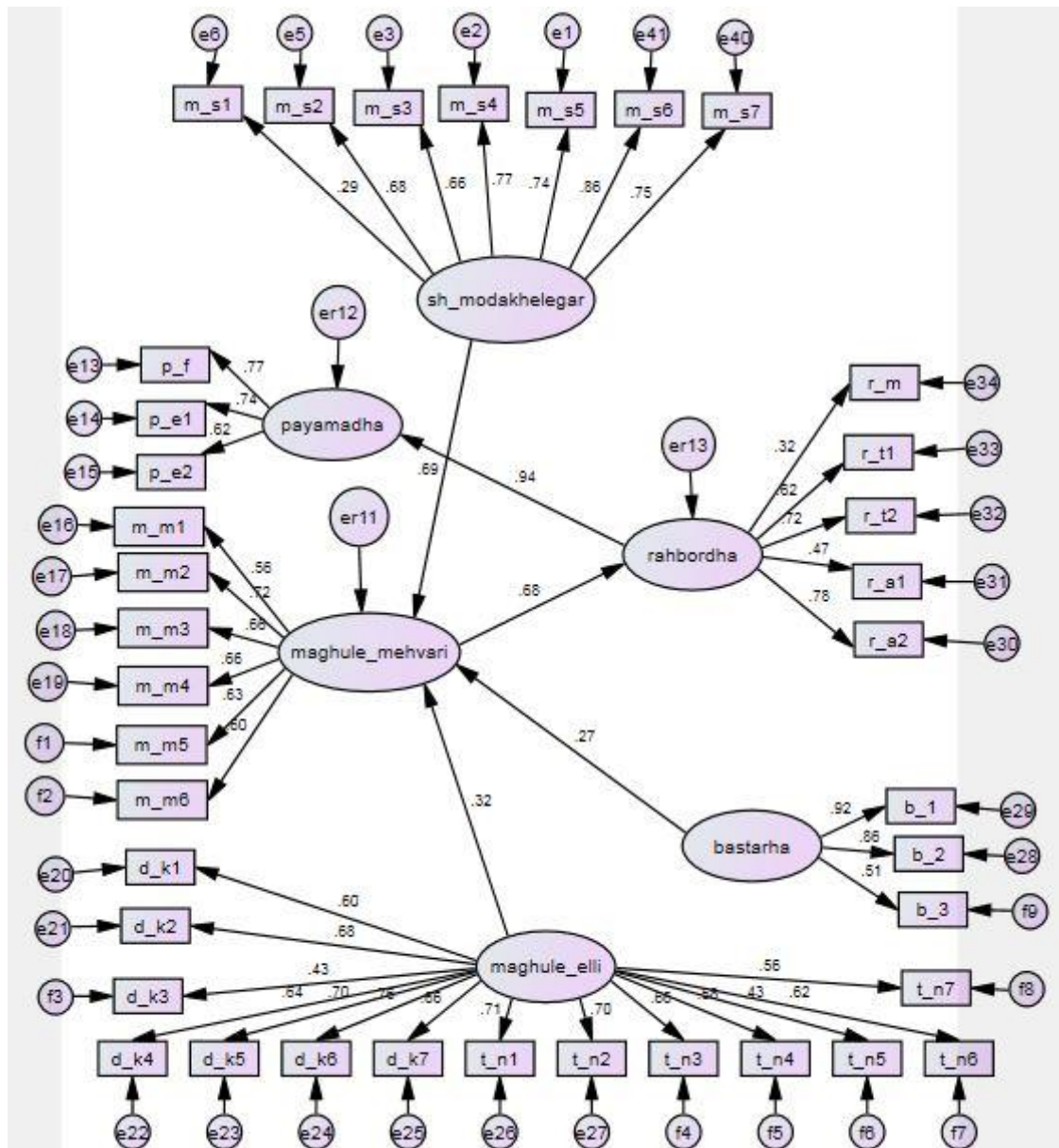| Result	Value	Effect type	Tolerance range	Title of index
Model Verification	0.92	Positive	GFI>0.90	GFI
Model Verification	0.93	Positive	NFI>0.90	NFI
Model Verification	0.92	Positive	RFI>0.90	RFI
Model Verification	0.91	Positive	IFI>0.90	IFI
Model Verification	0.91	Positive	CFI>0.9	CFI

Figure 2. Standard coefficients of research variables in the measurement model.

attention should be paid to the following issues in the policies of universities:

(1) Making profit in the university by involving in science and sharing the profit.

Table 2. Relationship between proposed model variables.

Effect type	Regression coefficient	Relationship between variables
Positive	0.69	Intervener conditions that influence central category
Positive	0.94	Strategies influencing outcomes
Positive	0.68	Central category influencing strategies
Positive	0.27	Contexts influencing central category
Positive	0.32	Casual category influencing central category

(2) Approving student projects and plans that address community problems.

(3) Enhancement of applied and profitable research projects.

(4) Special attention to the realization of the university outlook document.

(5) Developing the employment of academic graduates.

(6) Stepping on the path to specialization of these graduates.

(7) Considering academic patents.

(8) Focus on research, productive, applied and skillful aspects in the courses offered in the university.

(9) Allocation of sufficient fund to the academic plans and investment in the knowledge-based activities of universities.

(10) In order to create opportunities for university development, it is recommended that the chairperson of university maintain and strengthen its relationship with the provincial and state managers, elites and investors and invite national authorities to the university.

(11) Establishing training workshops and scientific and practical courses in university to enhance and transform the higher education system.

(12) Paying attention to new ideas in order to create appropriate conditions for university growth and development.

(13) Giving of material rewards to competent individuals (staff, elites, entrepreneurs, etc.) and appreciating and encouraging them during special events and festivals.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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