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Full Length Research Paper

Performance rankings in education: Implications for policy and practice

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In recent decades, school performance ranking (or 'league table') have become a common feature of many education systems in the world. The ranking is usually published by government and news agencies in an attempt to measure and compare the relative performance of individual schools against a number of criteria, including academic performance. This paper reports parts of larger case study that set out to investigate teachers' and students' perceptions of performance ranking in secondary schools in Kenya. The study participants were teachers and students of Mathematics drawn from secondary schools in Embu County in Kenya. Data were gathered through one-on-one semi-structured interviews, focus group discussions, and surveys. The transcriptions of the audio-recorded interviews and focus group discussions were analyzed by first reading the texts of the transcriptions holistically, followed by the development of codes, organizing the codes into larger categories and, finally, organizing the categories into overarching themes. This paper, in particular, examines the research findings through the lens of the existing literature on school performance rankings. The paper demonstrates how school performance rankings in Kenya have been abused over the years to the detriment of quality teaching and learning. Finally, the paper highlights the implications of school performance ranking for policy and practice.

Key words: Performance ranking, league tables, accountability, teaching.

INTRODUCTION

In recent decades, demand has grown for accountability and freedom of choice in the education system (Neves et al., 2014; Rosenkvist, 2010). Growing out of the performance management movement in the private sector, the most visible manifestation of this has been the publication of performance rankings ('league tables') based upon particular performance indicators (Ball, 2009; Leckie and Goldstein, 2009, 2019; Neves et al., 2014; Rosenkvist, 2010; Wilson and Piebalga, 2008). These rankings, which list schools in ascending order of performance, have been embraced as a feedback mechanism to induce organizational change by producing specific notions of what counts as a 'successful' or unsuccessful' school (Neves et al., 2014). A school that is ranked highly in considered a symbol of educational excellence and a significant source of influence in the development of educational policies. Teaching practices and institutional setups paradigmatic of the schooling in

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top-performing schools are featured in the media, exerting pressure for the borrowing of their educational practices and policies. Such comparisons between schools are problematic from both technical and methodological perspectives (Neves et al., 2014). Critics of school performance rankings have particularly argued that in many cases, the methodology of performance ranking is akin to comparing oranges to apples and tends to significantly overstate the difference. This paper reports part of a larger case study that set out to investigate teachers' and students' perceptions of performance rankings in secondary schools in Kenya. In particular, the paper examines the research findings through the lens of existing literature on school performance rankings. The paper demonstrates how school performance rankings in Kenya have been abused over the years to the detriment of quality teaching and learning. The paper also highlights the implications of school performance rankings for policy and practice. The paper examines selected literature on school performance rankings to understand their methodologies, their utility as a means for generating systemic improvement in the education system, as well as their weaknesses when viewed from the perspective of equity in education.

Methodologies of performance rankings

In an attempt to better reflect school effectiveness, the methodologies of school performance ranking have evolved over the years, and at least three can be identified in the literature. The first methodology is based on raw test scores of students in internal and national examinations. The raw student test scores are often expressed as percentages of students achieving a particular target. This method has been criticized for not taking into account the context in which the schools operate (Kellaghan and Greaney, 2001). In other words, the methodology does not separate the aspect of students' attainment that can be ascribed to teachers or schools from other factors that affect achievements, such as students' entry behavior, students' socioeconomic background, school conditions, and availability of adequate teaching/learning resources. Some schools admit students form backgrounds endowed with ample resources, while others admit students from low socioeconomic backgrounds. Therefore, a high rank for a school may reflect more the economic status of the community the school is part than the quality of teaching and learning in that school (Ozek, 2009). Consequently, a school might have a low rank compared with other schools regardless of high-quality teaching because it serves a less privileged community (Cobbold, 2004). On the other hand, high-quality teaching in secondary schools may result to students registering exemplary performance but fail to be reflected in the ranking data. This is because other schools may serve children from families endowed with adequate teaching and learning resources. Furthermore, a school that does not do well in rakings that are based on students' test scores might do very well in some other criterion. The use of raw test scores in performance ranking also fails to provide a clear picture of difference in the quality of teaching between schools and instead simply reflect differences in students' school entry characteristics (Lucas and Mbiti, 2011). As such, performance rankings can mask low performance among the second-rate schools with favored intakes. Further, the use of raw test scores in the performance rakings increases incentives for 'cream-skimming' by schools (selective admission of students with higher ability), or 'silt-shifting' (offloading students who are likely to lower the school's position in the rankings) (Kellaghan and Greaney, 2020; Wilson and Piebalga, 2008), non-promotion of weaker students, cutting back on subjects not examined, teachings to the test to ensure good students' scores (Kellaghan and Greaney, 2020). The use of raw students' scores in performance rankings may also encourage schools to resort to various forms of examination malpractices such as manipulating the test results and assisting the students with examination questions during national examinations (Kellaghan and Greaney, 2020).

The second methodology of ranking is the value-added models, which take account of students' prior attainment. Thus, value-added models provide a measure of a school's influence on the progress of a student. The value-added model helps to isolate the impact made by a school on the academic progress of students between the time of admission and the time examination was taken. There are various methods of calculating value-addition to a student. For example, the Department of Education and Skills in the UK uses a national "median line' approach, where the value-added for each student is the difference between their output point score and the median (middle) output point score achieved by others with similar input scores (prior attainment). So, for example, a measure of the value-added to students by schools is calculated by taking the score attained by a student just prior to entry into secondary school as the input score and the score attained at the end of the secondary education as the output score (Wilson and Piebalga, 2008). The value-added models thus reduce the motivation for "creaming" approaches since the different abilities of a school's intake are overtly taken into account (Wilson and Piebalga, 2008).

However, the value-added models do not fully separate effectiveness from the composition. While previous achievement is the most important predictor for future performance, other factors outside the schools control also influence student results. These include gender, deprivation, and high levels of student mobility (Wilson and Piebalga, 2008). The value-added models have also been criticized for hiding evidence of disparity in school

effectiveness (that is, differences in performance by any one school for its students of different abilities), which may limit their usefulness to any one parent trying to choose a school for their particular child. Besides, the extent to which, in practice, meaningful comparison across schools according to their value-added may be somewhat limited due to the extent to which their confidence intervals overlap (Goldstein, 2001). Finally, there is evidence that value-added model is not as stable across years as performance measures based on raw student scores, which again may limit its usefulness as a means of evaluating and comparing school performance (Wilson and Piebalga, 2008)

The third methodology of performance ranking is the contextual value-added models whose introduction may be seen as an attempt to better separate effectiveness from composition and so present a measure that better isolates the actual impact of a school on student academic progress. The contextual value-added explicitly takes account of various factors that are independent of schools but which are known to impact on educational outcomes, both at student and the school level, which includes gender, special educational needs status, socioeconomic status, ethnicity, deprivation, and peer group pressure (Wilson and Piebalga, 2008). The model incorporates data on student background characteristics as well measures of students' prior attainment, and school background. In this approach, each student is compared to peers who not only have similar input grades but who are also similar across a range of other contextual factors that are known to impact on educational attainment (Wilson and Piebaga, 2008).

Practices of performance rankings in various part of the world

Performance ranking of schools is a common phenomenon globally, and it differs in terms of the procedures and methodologies used, as well as the uses of such rankings. In the United Kingdom (England), the rankings were introduced in the mid-1980s (Goldstein, 2013), with the aim of providing clear and accessible information to parents on their children's academic progress. In 1995, the government introduced the value-added league tables in a bid to adjust results for students' entry characteristics and to provide confidence intervals for the mean scores based on relatively small sample sizes. Since 2006, "contextual value-added" systems have been used which, in addition to adjusting for a student's prior academic attainment, also attempt to adjust for factors such as the average prior academic achievement of a student's peers and family background characteristics (Dearden and Vignoles, 2011).

In Australia, the government provides detailed information about performance in schools reflecting average scores for statistically similar schools and all the schools in the country. In the United States, the National Assessment of Educational Progress (NAEP) produces the "Nation's Report Card", to inform the concerned parties about the academic attainment of students at the national level, and for certain assessments, at the state and district levels. The results are widely reported by the national and local media and are an integral part of government evaluation of the conditions and educational progress (Rosenkvist, 2010). In the Netherlands, the government publishes a "quality card" for every secondary school containing value-added school performance information. These cards show examination results, attainments in individual subjects, the number of dropouts, and a comparison of similar secondary schools in the region while controlling for differences in student intake at the entry of a formal stage of schooling (Timmermans et al., 2014). In Tanzania, performance rankings based on raw scores and improvement index are used to monitor schools performance by local education officials and the Ministry of Education (Blackmon, 2017).

In many countries, the league tables are published on an official website. For example, in Austria, Canada, Denmark, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Japan, Korea, Mexico, Netherlands, Portugal, Australia, Belgium Sweden, the United Kingdom(England), and United States of America. In Norway, results from the national student assessment are published on the local and regional level, while in Spain and Germany students learning outcomes are only published on the regional level (Rosenkvist, 2010). In the great majority of European countries, the aggregated results of national tests for each school are not publicized. In some countries such as Austria, Belgium, France, Ireland Luxembourg, and Slovenia, official documents state clearly that national tests cannot be used to rank schools. In Finland, there was a heated debate about publication of school performance rankings, but the national consensus was in favour against publicizing students test results (Parveva et al., 2009). In Russia, performance rankings are used by authorities to put pressure on different levels in the education system, where teachers and schools that were highly ranked are warded economic incentives, without taking into account the socioeconomic context in which schools operate (Tyumeneva, 2013). In some countries, performance rankings have been abolished because of their perceived negative effects especially on low-ranking schools, and the need to promote a culture that valued extra-curricular activities and character development. These include Northern Ireland and Wales (2001), Scotland (2003), Japan (2005), and Singapore (2012) (Rosenkvist, 2010).

In some countries, performance rankings are used for accountability purposes. In Malaysia, for example, performance ranking based on contextual value-added (CVA) and used as a tool for school improvement, accountability, informing policy makers, and for reporting

purposes to parents and the larger community (Nor, 2014). In Chile, the government initially employed school averages of standardized tests as indicators of effectiveness. Ranking from standardized achievement tests assisted the parents in choosing effective (or high valued added) schools for their children to attend and identify schools to get allocation of rewards and financial assistance by the government (McEwan et al., 2008). Later, a contextualized value-added model was introduced to provide information for accountability purposes (Troncoso et al., 2016). Similarly, in Uganda, the use of value-added measures created an intelligent school accountability system in which actions taken by the stakeholders in education were based on quality assessment data (Elks, 2016). The value-added measures challenged schools and students to work hard to register an improvement.

In some countries, such as Belgium, France, Luxembourg, Austria, and Slovenia, official documents clearly prohibit the use of students test scores to draw up comparative school rankings, as these are considered unlikely to improve educational attainment by schools and students. Indeed, only in the United Kingdom (England) does the publication of school students test results coexist with parental freedom to choose between schools- two factors which in combination are most likely to reinforce the influence of tests on school practice. In the rest of Europe, the most common model is the use test results for school improvement (Parveva et al., 2009).

Some countries publish performance ranking data in the media. The media has been instrumental in convincing the government to publish student test results at the school level (Rosenkvist, 2010). The student test results at the school level are often compiled and used as a basis for publishing league tables. In Australia, for example, the news media use test results on the government website *My school* to publish league tables (Rosenkvist, 2010).

In Portugal, the publication of school rankings data began in 2001. The Ministry of Education had declined to release the data on students' scores. Through a legal injunction, the Ministry of Education was forced to release the data on the scores obtained by the students in the national examinations held at the end of schooling. Portuguese school ranking are based on the raw data of the students' scores obtained in a given selection of subjects. That selection is usually made up of the eight subjects in whom more examinations were taken. Currently, there is criticism of the use of students' raw marks in performance ranking in Portugal because differences in students' intake mark the socioeconomic status of the student's background is not considered (Neves et al., 2014).

In Kenya, performance rankings began in the 1940s (Bogonko, 1992), and were based on raw students' scores obtained in national standardized examinations (Somerset, 1987). These rankings were banned because some schools were found to be manipulating the system by presenting only their best students for examination (Akers et al., 2001). In the last few years, the consequences of performance ranking have grown markedly. Manipulations of students' records were responsible for low transition rates (Clarke, 2002). The private schools discouraged weak students from sitting for national examinations so that they present the best students for the national examination (Maiyo et al., 2010). Certain schools came up with promotional grades requiring a student to reach a certain set of scores on internal tests to be promoted from one grade to the other (Koretz, 2002). The weak students were forced to repeat classes or register for the national examination in another school (Maiyo et al., 2010). Despite the ban, ranking continued at the provincial and district levels (Amunga et al., 2010). Similarly, in Ghana, the introduction of performance ranking in 2004 led to a sharp increase in examination malpractice in the senior Secondary School Certificate examinations. A more partial release of district-level students' examination results at the end of the basic level of schooling has been associated with a positive impact in a few districts in the student's academic progress (Akuffo-Badoo, 2017). In Finland, performance ranking is never practiced to avoid affecting the quality of education through unethical practices such as schools teaching for passing examinations to improve their rank in the league table to attract good students and teachers (Annala, 2015).

As noted in the discussion, there often exists a discrepancy in performance ranking from one country to another. Some countries make use of raw students' marks; other value-addition index, and other contextual value-addition index. There seems to be strong evidence that the contextual value-addition index is fair as it adjusts for students' intake differences between schools to measure the effects schools have on the students. The contextual value-added approach recognizes that students have different capability and abilities which are influenced by school context and students backgrounds there by influencing student's rate of educational progress (Downes and Vundurampulle, 2007). As Sander (2000) describes it, if education is seen not as stair steps but as a slope upon which students in the same grade will be at different points and school effectiveness can influence the speed at which student's progress in their academic work. Contextual value-added approaches seek to gain a clearer impression of a student's progress by comparing their level of attainment to other students of similar ability and background (Downes and Vundurampulle, 2007). These adjustments of student's scores to external factors using contextual value-added measures aim to give a more accurate indication of the influence a school has had upon their students. Students are motivated to study more since there are justice and fairness in practice. Therefore, performance ranking

becomes a motivation to both the school and the student.

Merits of performance rankings

Proponents of performance rankings in schools present several specific arguments to support the practice. First, the performance rankings can be used to incentivize teachers, either by publicizing the rankings or by providing financial rewards to teachers for high student academic achievement. To be sure, performance rankings have been used as a means to incentivize teachers, even though this very act has been criticized for encouraging teaching to the test (Rosenkvist, 2010). This is because, by publicizing the rankings, schools and teachers can be compelled to internalize the norms, values and expectations of education stakeholders and to accept responsibility for conforming to them.

Second, performance rankings provide information to parents for school choice (Dearden and Vignoles, 2011). Parents use the published school performance data to, at least partly, inform their choice of school for their children (Benson et al., 2015). It may be argued that outside performance rankings, parents may not have a way of measuring the relative performance of their children's schools. As such, many schools use performance rankings as a marketing tool (Blackmon, 2017).

Third, performance rankings stimulate improvement through competition as they help in focusing the teacher and student efforts on the goals of instruction and providing standards of expected achievement that students and teachers can aspire to, thus, creating a system of measurement-driven instruction. Additionally, competition for a better rank motivates the school management to appropriately coordinate both physical and human resources for the betterment of student's academic outcomes (Limangura et al., 2017). Performance ranking also guides various education stakeholders in rewarding good performance.

Fourth, performance rankings can be used as a valuable tool for identifying underperforming schools (Greaney and Kelleghan, 2004). Through the information from the performance ranking data the underperforming schools are identified and the reasons for under-performance are investigated to come up with strategies of addressing the challenges such schools may be experiencing. The rankings can help in effectively allocating resources to the underperforming schools, provision of practical advice regarding the skills to be developed and types of targets to be set based on the need to guarantee value for investment.

Fifth, the assessment of schools based on performance ranking holds secondary schools publicly accountable for the students learning outcomes in national standardized examinations (Dearden and Vignoles, 2011). This is useful to prospective students and interested parties in that it reveals the outcomes of the school's core business that is academic achievement. Prospective students and interested parties assess schools, with statistics and measures which are obtained from the performance ranking data (Nunes et al., 2015). The publication of the performance ranking data is associated with a decrease in the number of students attending schools that are rated poorly and vice versa (Nunes et al., 2015). This comes about due to a more informed parent choice of schools for their children through performance ranking data. Parents are attracted to take their children to the schools which are at the top of the rank and with a bigger proportion of students qualifying for the next level of education. The practice prompts schools to improve their academic standards by providing all the necessary support to students which translates to a better student's achievement.

Finally, the importance of performance ranking is motivating to students through the grading system, which arises from the importance of grades in indicating students' ability and learned knowledge (Cherry and Ellis, 2005). Grades attained by students' area a key signal about student's effort, proficiency and ability in certain professions. Consequently, students are motivated to make choices that will enable them to attain better grades. In essence, students complete for a limited number of grades with their relative performance determining their final grades (Cherry and Ellis, 2005). Performance rank-order grading improves student performance though it may not be productive in all situations.

Demerits of performance rankings

Critics of school performance rankings contend that the rankings can lead to manipulation of data by schools as well as teaching to the test to boost a school's ranking (Rosenkvist, 2010) For example, in England, schools allocated the most experienced teachers and more support staff to the examination classes to improve their rank (Cobbold, 2010). The practice resulted in the sacrifice of the longer-term development of students which compromised the standard of education in the country.

Indeed, when accountability systems put teachers under intense pressure to get good results and on schools to have high rankings, the likelihood of cheating increases (Cizek, 2001). In their effort to obtain a better rank position, students (and sometimes teachers) resulted to various forms of cheating designed to give a student or a school undue advantage over others (Njue et al., 2014). Some of the examination malpractices are students copying from other students during an examination, collusion between school principals and examination supervisors and purchasing of examination materials among others (Njue et al., 2014). The practice results in producing graduates who have no adequate

qualifications for further studies in various fields. Besides, performance ranking creates incentives for schools to ignore the low-achieving students and highly focus on the high achievers and average students in various disciplines (Reed and Hallgarten, 2003). Similarly, most schools have increasingly concentrated on students who are on the border of accepted benchmarks rather than the lowest achievers in order to have a better rank in examination outcomes (Gillborn and Youdell, 1999). Additionally, schools provide special classes for students at or near the borderline of the desired targets for them to boost the school performance to improve their rank (Galton et al., 2003). Improving scores of students at the border line is seen as the most efficient way to raise a schools average score or the proportion of the students achieving an average score. The low achievers in secondary schools are forgotten and end up discouraged and feel discriminated against which affect their self-esteem and label themselves as weak students.

Furthermore, performance ranking is, to some extent, responsible for introduction of private tutoring of students in desperation to obtain a top rank. Private tutoring, in so far as it is successful it maintains and exacerbates social inequalities as wealthy households can invest in more and better tutoring than poor households (Kellaghan and Greaney, 2020). This leads to the rise of concerns at different times over its perceived negative effects on social inequity in education. Additionally, private tutoring re-enforces the obstruction of the efforts to make the education system less depended on examination as seen as an essential ingredient in the demand for private tutoring services among students (Kellaghan and Greaney, 2020). Further, private tuition presents opportunities for corrupt practices in teaching and learning. Some of the corrupt practices involve pressurizing students to take private lessons by teachers failing to teach crucial aspects of the curriculum during regular lessons.

Moreover, performance ranking has led to negative competition among schools which discourages collaboration. The school collaboration is discouraged because performance ranking encourages competition between schools rather than collaboration and co-operation. This undermines one of the key measures of school improvement which is the opportunity and capacity of schools to learn from each other. This practice promotes school isolation and self-reliance which often leads to a reduction in cross-school collaboration (Whitty et al., 1998: 62). In turn secondary schools become reluctant to share their successful practices in their teaching and learning with other schools to avoid those schools appearing ahead of them in the school performance rankings data (Cobbold, 2004). This study subsequently provides a Kenyan perspective of performance ranking based on a study that sought teacher's and student's perceptions of performance ranking in secondary schools.

Performance ranking in Education: A Kenyan perspective

As noted earlier, performance ranking of schools and students in Kenya began in the 1940s (Bogonko, 1992). The modality of ranking was on achievement in national standardized examinations (Kellaghan et al., 2009), unlike modalities used in other countries that look at other factors that contribute to an all-round students (Harris, 2011).

Performance ranking in standardized national and internal examinations at the national, county and sub county levels continued until 2014 when the government banned the practice (Wanzala, 2014) as a result of unethical examination malpractices (Ochola, 2011). Despite the ban, malpractices persisted in 2015 (Murori, 2016), suggesting that performance ranking was not really the major cause of examination malpractices. Nevertheless, performance ranking had a great impact on teaching and learning practices employed in schools in Kenya.

The ban on performance ranking in examinations generated heated debate and as a result of the pressure, the government lifted the ban in 2016 but with a significant change in the modalities of inclusion of co-curricular activities (Republic of Kenya, 2016). According to the guidelines, performance ranking was to be based on the students' raw scores in standardized examinations and students achievement in co-curricular activities. However, the new guidelines are yet to be implemented and the rankings are still based on students' raw scores (Nyamwembe, 2020). In order to gain a deeper insight to the issue, a mixed method case study was undertaken to explore the perception of teachers' and students' regarding to school performance rankings in Kenya. The following section provides the research context and the methodology on how the research was conducted.

RESEARCH CONTEXT AND METHODOLOGY

In 2018, a mixed methods case study was carried out with teachers and students of Mathematics in Embu County in Kenya. The primary aim of which was to understand their perceptions of performance rankings in secondary schools. The participants were drawn from public secondary schools in Embu County in Kenya. Embu County is one of the 47 counties in Kenya, and it lies between latitudes 0° 8'and 0° 35' South and longitudes 37° 19' and 37° 42' East. The county covers an area of approximately 2,818 km^2. In Embu County, there are two categories of secondary schools, namely, public and private. The public secondary schools are further categorized into four types: National, Extra county, County, and Sub-county schools. There are 2 national, 14 extra county, 22 county, 148 sub-county, and 8 private secondary schools in Embu County. The secondary education cycle in Kenya is divided into 4 grades called Forms (Forms 1, 2, 3 and 4).

Purposive sampling was used to select the county (Embu, while multistage stratified sampling was used to obtain a sample of 26 students and 9 teachers drawn from one national, one extra county, two county, two sub-county, and two private schools within Embu County (Table 1). The considerations of various categories of

Table 1. Sample size.

S/N	Category of schools	Teachers' participants		Students' participants	
		Male	Female	Male	Female
1	Private	1	1	2	2
2	National	1	0	3	1
3	Extra county	1	0	2	3
4	County	2	1	3	5
5	Sub-county	0	2	4	1
Total		5	4	14	12

secondary schools were aimed at enhancing the diversity of the sample.

The study aimed at gaining insights into the perceptions of teachers and students on the issues surrounding the performance ranking of students and schools in participant's natural settings. The study, therefore, adopted a qualitative approach and a case study design. Data were gathered through one-on-one semi-structured interviews and focus group discussions lasting between 40 to 60 minutes. The research instruments (interview guide and focus group discussion guide) were peer reviewed, and a pilot study was conducted to ensure validity and reliability of the instruments. After the pilot study, the research instruments were amended accordingly. The collected data were transcribed and subjected to qualitative data analysis. The interviews and focus group discussions were audio-recorded, transcribed and analyzed for codes, categories, and themes through an iterative back-and-forth process of relating portions of transcriptions and the entire transcription.

FINDINGS AND DISCUSSION

Three broad themes emerged from the data analysis: methodological fairness, teacher accountability, and transition rates. Each theme is discussed in the following.

Methodological fairness

Performance ranking of schools and students in the Kenyan context was aimed at disseminating information on students' performance and hence promote healthy competition between schools. Therefore, the practice would motivate teachers to improve their instructional practices for students learning (Shindler, 2010). Conversely, the publication of results led to examination malpractices which had several effects on teaching and learning. Therefore, the government of Kenya banned the performance ranking of schools and students in 2014 due to unethical examination malpractices such as cheating in standardized national examinations. In 2016 the ban was lifted and the proposed methodology of performance ranking was based on the students' raw score in standardized national examinations and performance in co-curricular activities. Interviews with students and teachers pointed out that the methodology of performance ranking proposed by the Kenyan government should be revised to include students' raw marks, co-curricular activities, and the students' intake mark in form one.

…… p*erformance ranking should include students raw scores, entry marks in Form one to reflect value-addition on the students by the school and co-curricular activities because there are students who are good in games, athletics drama, etc. This will help so that what the learners engage in and out of class is taken care of during ranking (Teacher in a national school).*

Similar sentiments were echoed student-participants and by teachers in a focus group discussion.

……. to fairly use the performance ranking data the methodology used should take into account the students' raw marks, entry mark in form one, and score in out of class activities such as athletics. In this way, performance ranking will keep students motivated to keep on working hard in and out of class (Focus group discussion with teachers in a private school).

Performance ranking is good because it helps students to be motivated to keep on working hard. Whatever, the position one is encouraged to work hard (Form 2 student in a private school).

Results show consensus as far as performance ranking modalities is concerned. It is important to note that the study has revealed that performance ranking was crucial in schools if it was modified to enrich students' scores to reflect all that the students are exposed to in the school. This is an indication that the majority of the respondents opined that performance ranking should not be abolished but revised to reveal the influence of teachers and schools on students' performance. In line with the study findings, Whiston (2009) opined that performance ranking is crucial as it helps students understand how a variety of personal attributes (that is, interests, values preferences, motivations, aptitudes, and skills), impact their potential success and satisfaction with different subjects and work environments

The category of school a student is admitted to makes

a great difference in the students learning outcomes. This is because some schools admit students with low entry marks than other and have adequate teaching and learning resources in comparison with others. Therefore, if the performance ranking of schools and students was to be fairly done it should take into account student's different starting points and availability of adequate resources (Berliner, 2011). In Kenya, there are four categories of public secondary schools, namely National, Extra County, County, Sub county schools. Up to 2014, before the government banned performance ranking, the practice was unfair as it failed to take care of differences in the socioeconomic status of the school as revealed in this study. Therefore, performance ranking was an ordinal measure and did not measure performance relative to specific standards such as the availability of ample resources from use by students and students' entry marks. During the interviews, it was unanimously agreed that the rankings were misleading because they compared what was incomparable.

Performance ranking is okay but there should be categories of schools because it is unfair to rank sub-county day schools and national schools. After all, the entry behavior of students in those schools is quite different (Teacher in a county school).

It is important to note that in Kenya, students are not randomly placed in secondary schools in the country. This practice promotes the placement of students with high form one entry marks to national schools and those with low entry marks to sub-county schools. Therefore high performance in national schools may not be attached to the influence the school and teachers have on the students' achievement but reflects the category of the students admitted to those schools.

…. performance ranking should not be abolished but should be based on the categories of the schools e.g. nationals. This is because the entry behaviors' are different. The idea of the best schools should not be there because it is not possible to compare the upcoming schools and the established ones. This can end up killing the upcoming schools. Performance ranking should be based on like with like. County secondary schools should not be ranked with sub-county schools because they have differences in teaching and learning resources used by students. The schools do not share the same experience (Teacher in a private school).

Most importantly schools located relatively in low socioeconomic areas cannot achieve the same level of academic performance as schools located in high socioeconomic areas (Neves et al., 2014). Therefore, the ranking should be based on the categories of schools because schools in the same category have many things in common such as student's entry marks, teaching, and learning resources available. To understand the true picture of the school standings as far as the influence they have on student' performance the government of Kenya should create mechanisms of ensuring equitable distribution of resources and place students to secondary schools randomly.

Teacher accountability

Accountability has become the cornerstone of education reforms. The assumption is that teachers and administrators are held accountable for the students' outcomes in teaching and learning (Hopman, 2008). By measuring students' learning outcomes and holding teachers responsible for the students results, accountability systems tend to create motivations for improved students learning outcomes (Kellaghan and Greaney, 2020). Nevertheless, the data from the study has shown that accountability gave rise to unethical behavior by some teachers such as cheating in examinations and teaching students on test-taking skills as opposed to teaching for conceptual understanding (Rosenkvist, 2010).

……I have taught this school for five years and at the end of each year, the data on student achievement is prepared for all subjects. The top ranked teachers are given letters of exemplary students' students' performance and the low-ranked ones are required to explain the causes of the low rank. Some teachers leak examinations questions to students to obtain a top rank to avoid issues with the administrators. (Form 3 teacher in a county school).

…..teacher whose classes perform better in comparison to the other is usually given the privilege in any appointments. This is because even the employers of teachers recognize and promote the teachers whose subjects are performed well comparatively (form 4 teacher in an extra-county school).

Rewarding or punishing teachers and schools based on students' performance was not only practiced in Kenya as revealed in this study but also it was practiced in other countries. For example, in Texas, schools were assigned ratings based on student outcomes and high performing school received monetary rewards and low performing schools were subjected to state intervention (Toutkoushian and Curtis, 2010). Tying teacher evaluation and sanctions to student's performance can discourage teachers from willing to work in schools with very needy students and effect teacher collaboration in teaching and learning. Collaboration practices enable teachers to work together across classroom boundaries towards a common goal of educating all students in their maximum potential.

…. teacher evaluation based on his/her class position in the ranking data has been motivating teachers to subject students to a vigorous revision of examination past papers and omitting some crucial areas of the curriculum. In some cases, teachers gave students marks they never deserved to protect their job. In private secondary schools, low students' performance can lead to loss of job (Form 4 teacher in an extra-county school).

As revealed in this study tying teachers' accountability to students' performance motivated teachers to drill students on test-taking strategies neglecting knowledge and skills that are important aspects of the curriculum (Rosenkvist, 2010). As a result of the omission of some aspects of curriculum, students are less prepared for further education and the job market (Berliner, 2011). Therefore, it is important to note that teaching to the test does not necessarily translate to the broader skills that the students are expected to display outside the school environment for example in the job market.

Secondly, trying teacher's accountability to the class position in the ranking data motivated teachers to inflate the test results, especially in private schools to avoid loss of job due to low performance (Berliner, 2011). Therefore, it is worth noting that the focus of performance ranking data should be for the competition meant to provide incentives for teachers and schools to innovate and create effective learning environments as opposed to reward and promotion of teachers. Most importantly, the test scores can provide an unreliable measure of performance because they are affected by the conditions under which the students' are when taking the tests (Leckie, 2013). Consequently, attaching teacher accountability to students' performance has led to a top rank in the performance ranking data without improvement of students' broader knowledge and understanding.

Moreover, the performance ranking of schools and students can be utilized by students, teachers, and school administrators. The students can use the performance ranking data to identify peers to seek help from in-classroom discourses. While the school administrators and teachers can use the data to identify the underperforming classes for remediation and use the top classes for benchmarking purposes (Rosenkvist, 2010).

Transition rates

Based on this study, transition rates refer to the percentage of students who officially complete the four-year secondary school cycle and sit for Kenya Certificate of Secondary Education Examinations (Koech et al., 2017). Transition rates in secondary schools are affected by some students' who drop out of school due to various factors. One of the factors is the forced repetition of classes due to low performance. In forced repetition, students are required by the school administration to remain in the same class for an additional school year to give struggling students academically more time to master the appropriate content for the school to appear at the top of the rank. Therefore, secondary school ranking has encouraged the school administration to use such an unethical approach to achieve top rank in the performance ranking data. A good number of students made to repeat cannot endure more frustration and drop out of school affecting transition rates (Koech et al., 2017).

I feel performance ranking should be based on students' improvement mark. This will allow all the students to appear at the top of the rank at one time or the other. If student's raw scores continue to be used somebody like me will always remain at the bottom of the rank and most likely I will be forced to repeat Form three. If that happens I will transfer to another school or drop out of school to pursue a course in masonry (Form 3 student in a county school).

Students at the bottom of the rank are embarrassed by teachers during closing assembly ceremonies. When releasing the academic performance data teachers mock the bottom three students by remarking that they are leading from the bottom and competing for the bottom ranks. The majority of the students have dropped out of the school due to such embarrassment (Focus group discussion with student–participants in an extra-county school).

The study revealed that students dislike the idea of forced repetition with the majority preferring to seek admission to another school rather than to repeat in the same school. If the opportunity in another school is not available the students prefer to drop out of school. Additionally, students drop out of school as a result of the way the low ranked students are embarrassed during academic ceremonies during the announcement of student's academic performance by teachers as revealed during a focus group discussion with students. The examination aims to identify the students' gaps in education and not embarrassing them especially in school end term closing ceremonies when announcing students' academic performance.

Implıcatıons of performance rankıng for polıcy and practıce

Respondents as well as the literature on performance rankings concur that policymakers need to orchestrate the development of methodologies of performance ranking that can facilitate authentic teaching and learning experiences. In particular, there is need for performance ranking methodologies that provide a broader picture of individual school and student achievement. This would

lead to equity and justice in resource allocations. More resources channeled to low performers as a motivation to work hard and improve their performance and the top-ranked schools being approved as the centers of excellence. Further, policymakers can propose a ranking methodology that identifies the unique strengths of students and schools building on them more effectively to encourage engagement of students in learning. Engaged students are more emotionally connected to what they are learning and contribute positively to the learning process. Finally, educational policymakers' considerations of giving incentives or awarding teachers based on school or student performance in the league table might reflect on the research literature and research findings in this article that has highlighted the adverse effects of performance related incentive schemes.

A good performance ranking methodology ensures the responsibilities and accountability of school principals are increased. Their work and representations are impacted by the ranking of their schools. Those whose schools appear at the top of the rank are promoted and enjoy the privilege of being a representative of the rest in the school principals at national levels in education decision-making forums. Most directly, performance ranking inform decision making to make changes for continuous improvement of school programs. Further, hard work is rewarded while encouraging low achievers to work hard to enjoy the fruits of hard work and help the school community to set up strategic goals for excellent student academic outcomes.

Conclusion

This paper has considered the origins, methodologies, merits, and demerits of performance ranking. Additionally, the paper has presented the Kenyan experience of performance ranking on issues concerning methodological fairness, teacher accountability, and transition rates. Further, the paper discussed the implications of performance ranking on policy and practice. As noted in this paper, there often exists a discrepancy in performance ranking from one country to another. Some countries make use of students' raw marks, others value-addition index while others make use of contextual value-addition index. This paper revealed that there is a paradigm shift from value-addition index to contextual value-addition. The reason behind the change is that the contextual value-addition index is a fair measure of students and school achievement as it adjusts for students' intake differences between schools to measure the effects schools and teachers have on the students. In the Kenya experience, the paper revealed that the proposed methodology in performance ranking after the ban was lifted should be reviewed to take care of student entry behavior and ranking schools to be based on their categories.

In this paper, the literature showed that performance ranking affects students' performance in general as the weak students are discouraged while the best performing students are motivated to put more effort into their study. Discouragement of students results because of the way performance ranking is done for the practice fails to take into consideration disparities in such aspects as availability of teaching/learning resources and student's entry marks among others. Therefore, to ensure equity and justice in education, this study revealed that contextual value-added measure is a fairer measure of students' and schools' academic achievement.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests

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Review

Ecocritical approach to children's literature: Example of "*I am a Hornbeam Branch*"

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Eco-criticism determines how the relationships of each element belonging to the field of being outside the human beings with each other and their environment are depicted in literary texts, the approach of literature to these relationships, as well as the forms of discourse in which a human being can direct through language. The aim of this study is to examine the children book entitled *I Am a Hornbeam Branch* by Hasan Ali Toptaş in the context of human-nature relationship and question with what perspectives eco-criticism scrutinizes such literary texts. In this study, the possibilities of thinking about nature are discussed through "I am a Hornbeam Branch" written in an eco-critical language. In the thought imposed by the "human" oriented hierarchical order, inquiries have been made that every living thing other than a human being is considered as the "other" and deprived of an identity owing to the lack of language and intellect. Furthermore, it has been determined that the representation of "nature" is presented in a cycle based on ecological consciousness by taking into consideration material transformations and that the problems of nature are cited not only environmentally but also as sociological, psychological and cultural problems that concern humanity.

Key words: Human, nature, environment, ecology, eco-criticism, children's literature.

INTRODUCTION

Disengagement of human beings from nature began by owning the land and propertied it. In addition, ideological transformations in beliefs, philosophy, science and politics have accelerated the process of seeing nature as a source of raw materials (Şen, 2018: 33), and have supported the idea that civilization and development will be achieved by man's domination of nature. The operational aspect of this ideological process has accelerated with technology, and "human" has become nature's greatest threat. The ecological problems that need to be dealt with and the literary, sociological, political and cultural perspectives behind them have revealed the fact that the natural balance to be established with other creatures for a livable and sustainable world cannot be achieved solely with the technology and science. In this direction, all components that make up modern thought, culture and civilization have been discussed with an ecological perspective, and has revealed that ecology is not only a subject of natural sciences (Şen, 2018: 34). It has been noticed that the

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relationship between man and nature is shaped by the discourses drawn by "language" in line with the interests of societies.

Ecocriticism offers the opportunity to examine the relations between literature and environment, ecology, and culture indepth by interpreting literary and cultural texts from an environmental perspective. On the basis of eco-criticism, which maintains that the perfect balance of the world can only be achieved in cooperation with "human-nature" and with the acceptance of the original identity of each living thing, there is "human" who is a part of the environment and has a common living space with other living things. Ecocriticism, which carries its analysis and opinions to multi-dimensional approaches in contrast to an anthropocentric point of view, thus offers an interdisciplinary field of study. It sees all elements of nature as a whole by attributing intrinsic value to nature (Oppermann, 2012: 15) and argues that the right to life of all living things should be respected.

Ecocriticism aims to bring ecological consciousness to the reader by overturning the hierarchical order based on human superiority and deeply shaking the absolute authority of man over the universe. In doing so, it "transforms nature from being a romantic, idealized object or served to the service of human beings and into a scientific platform." (Sarıkaya, 2012: 96). In this understanding, nature is accepted as an entity that can define its "own" identity through "itself", rather than being a secondary element that is presented to the disposal and endless consumption of man, completing its existence through human. As a matter of fact, in the destruction of nature, the answer given by nature to human is also evident: If nature dies, human also dies!

Ecocriticism, combined with postmodern theory, which draws attention to the interests of monological discourses by rejecting a single and fixed identity, encourages new ideas that deal with discourse and the physical world together, and points to an existing cycle:

We do not see a difference between human and nature: the human essence of nature and the natural essence of human unite in nature in the form of the production of diligence, just as they unite in human life as a species ... human and nature are not confronted like two opposite terms ... More precisely, they exist as sole and whole fundamental reality, hence the manufacturer's product. (Deleuze and Guattari 1984, as cited in Oppermann, 2012).

Ecocriticism reads literary texts from world-centered approaches and especially encourages the teaching and research of a textual understanding in which the environment is not written only in the fictional-reflective meaning. Eco-critics are interested in how discursive conventions enable and constrain our contact with environment, how much the environment affects literary representations and how the means of representation shape our sense of place. (Speek, 2000: 160).

The most important point in the art of rhetoric, in which the truth is shaped according to culture, language and people, is determined by the boundaries of language; language can distort reality and knead it according to itself, and involves the vital roles played by the discourses created between genders, classes and ethnic groups. Since culture is a system of values that are shaped by the boundaries of the human brain, produced by it, and where rights and wrongs are determined according to human interests, the sphere of influence created by discourses is not the same for each group of society:

“Therefore, it should be kept in mind that even discourses that are candidates to oppose or disrupt practices that harm the environment can be owned or manipulated. For example; although wildlife seems to threaten an industrialized, prosperous social order and worldview, some of the actors of this order, such as off-road vehicle manufacturers, have embraced wildlife as the 'natural environment' of their products in their advertisements ”(Garrard, 2016: 23).

The result that can come out of such an opposition shows that natural life is based on an ideological basis in line with human interests and that the unlimited consumption of countries can even help them gain sympathy.

Within the poststructuralism critique, where ecocriticism shows growth, the relationship of signs with each other rather than pursuing the "real" is emphasized. Along with these fields, developments in other fields such as feminist literature have strengthened the thought underlying the language and reality distinction. Feminist critics "revealed the difference between sex as a biological category and gender as a social construct, and underlined how the male-centered worldview and social order tried to justify changing gender constructions by portraying them as" natural "sexual identities (Garrard, 2016: 24). In this respect, "femininity" includes the reactions of a cultural encoding, beyond being inherent in the natural characteristics of genetics. These readings belonging to different fields enabled us to make sense between the lines of all kinds of formations in society, especially in many fields such as politics, advertising, literature, art, and marketing, different from what is seen. At this point, the ecology movement that can be realized and every reading made in an eco-critical sense is not a shallow ecology movement that explains environmental problems only with the limitation of natural resources and emphasizes environmental protection policies. The shallow ecology movement is extremely inadequate to tackle today's environmental problems. Shallow ecology, with an ongoing human-centered perspective, “establishes a self-interested relationship between human and nature” (Dindar, 2012: 60). This relationship places human in the role of its ruler or master of nature. This role gives human an unlimited right and freedom to exploit nature. On the other hand, eco-criticism aims at bringing a new

consciousness by changing people's perspective on nature. Instead of human-centered thinking, it is necessary to create a new environmental ethic and try to explain that even the smallest damage they cause to the environment is actually the damage they cause themselves (Sarıkaya, 2012: 99).

The first step of eco-criticism philosophy is the realization of the self-realization potential of the human being and starting to live consciously. In this way, the philosophy of self-realization, which has the belief that the consciousness acquired individually is shared by all humanity, becomes a lifestyle. In this lifestyle in which ecological consciousness spreads, there is a cycle where everything is interconnected. In this cycle, living creatures act as chains in relation to each other, rather than being positioned up or down. Thus, human beings consider their existing relationships and connections with “other living and non-living beings, ecosystems, the earth, itself and its bad history” while forming its selfness. (Dindar, 2012: 79). The "self" created in an ecologically based system includes multi-faceted connections that are not purely linear.

In eco-criticism, where knowledge and existential philosophy work together, it is never forgotten that discourse is the product of language, therefore it is considered simultaneously with human beings. Meaning is provided only on condition that these two are together. Studies conducted within this scope brought together materiality and discursiveness, causing a paradigm shift in social sciences, natural sciences, and environmental human sciences (Yazgünoğlu, 2012: 329). Literature, which is one of the most important branches in which social sciences can use the possibilities of “language” in terms of creating an eco-critical consciousness, and especially children's literature due to fun, informative and at the same time creative, is the most critical field in which the ecological consciousness is created by this paradigm. As a matter of fact, the child, who can be associated with the primitiveness of the subconscious that cannot reach the limits of the "I", "has not yet divided and separated his specific experience with irreducible oppositions. In his narrow universe, spirit and matter are intertwined and they are defined as gods who produce humans in forests and fields.” (Jung, 1994, 34). In her world, the "mother nature", which has similar characteristics with his mother from the moment of birth, occupies a large place. "Mother nature" archetype, with characteristics such as "wisdom and spiritual sublimity far beyond reason, good, nurturing, carrying, providing growth, abundance and food, place of transformation and rebirth” (Jung, 2005: 23), was entrusted to the individual when he was a child. Then, with the imposition of the "subject" by modern thought and the life experiences it adds to the primitiveness of human beings, the subconscious leaves itself to the consciousness. Everything that we are conscious of "naturally joins the "I" through consciousness" (Jung, 1994: 64). The subconscious, on the other hand, works quite differently from the "consciousness" and the "I" to it because it does not accept a center and hierarchy. Jung, saying "if the subconscious personified, it would carry the lines of a holistic creature living on the border of birth and death, man and woman, old and young," (Jung, 1994: 30), underlines the common philosophy of childhood and nature. In this philosophy, there are holistic instead of dualities, cycles instead of hierarchical and linear structure, and many points where life can be sustained instead of the center. Therefore, children's literature is a highly effective tool in promoting environmental literacy. This is because children's books by breathing life into concepts that are perceived as inanimate, provides children with not only fiction, but also words and pictures that will enable them to think about environmental problems and situations. In this way, children's literature can become a powerful code in guiding children's minds, children of all ages can learn many aspects of their environment and better understand the relationship of their lives with their environment. Thanks to the strong codes created through children's literature, the child is able to carry his "nature" to the future without melting it in the limits of modern consciousness and the individual.

I AM A HORNBEAM BRANCH İN THE CONTEXT OF ECOCRİTİCİSM

Hasan Ali Toptaş's only children's novel, *I Am a Hornbeam Branch*, is the story of the trees living behind the *Beşparmak Mountains* in the Aegean lands and a hornbeam who grows with them and feels the pain of maturing as they grow. Pines, firs, spruce, junipers, chestnuts and even an old oak, not just trees; Birds, other animals, herbs, in short, all living creatures living in the forest are described through the eyes of the child hornbeam. After humans set foot in this beautiful forest and brought pain here, the minds of the forest dwellers were filled with curiosity and anxiety. It would be exceedingly difficult to face this end for the hornbeam who never hope to be gallows while dreaming of having many things worth the pain of it after it is cut.

In the story, the reader, while witnessing the ontological searches of the hornbeam and his friends, also finds the opportunity to reflect on the journey of man to himself. Therefore, the study aims to reveal the pro-natural discourses of literary texts while focusing on the ecological consciousness of this search for identity and journey.

IDENTİFİCATİON VİA "MYSELF": "I EXİST TOO!"

Ecocriticism does not only examine how nature is reflected in literary works, "but also scrutinizes the symbolic meanings attributed to nature, the thought

patterns created by these meanings, how nature and animal species shape human cultures, how language is used, how to approach environmental problems." (Oppermann, 2012: 25). With such an understanding, Hasan Ali Toptaş's work, *I Am a Hornbeam Branch,* depicts the adventure of the existence of those who are not human, through the "self", from the mouth of a hornbeam. For hornbeam, saying *"I was a very young hornbeam in the Aegean soil"* (Toptaş, 2016: 7), this awareness is not limited to itself but also finds its place as the awareness of environmental identities:

Birds would fly over me from morning till night, varicolored clouds from shape to form would fly. Of course, I also had neighbors, each one more beautiful than the other, greener than the other, better than the other. For example, a few trees tall, there lived a hunchbacked fir that was thirteen years older than me. There was also a middle-aged hornbeam just a short distance from him. Farther, there were red pines with their crispy cones, then there were fuzzy junipers, spruces, and chestnuts… (Toptaş, 2016: 7)

These lines make the reader sense that there is life other than himself, and that the act of being takes place in perfect beauty. This way of expression means "I exist in the world you live in!" and has the same meaning as the saying. In traditional thought, a relationship is established between matter's lack of intelligence and its "non-existence". For this reason, due to the superiority of using the "language" feature, human beings define "other" entities outside of himself as unwise. With movement of material transformation, it is argued that non-human beings are in contact with their environment just like humans. Thus, the fact that material formations as well as discursive formations based on language play a role in the production of knowledge has reduced the purely human-centered perspective in many areas. Therefore, discursive formations should be considered not alone, but together with material formations (Yılmaz, 2012: 132). It is possible to see the traces of material transformation in *I am a Hornbeam Branch* in the following lines:

The herbs around us were even singing, insects wandering from right to left, long-eared rabbits, foxes with rabbits, wolves and stones were singing too. In short, everything in the forest was participating in this song with its own voice.
Everything was participating with its own color.
Everything was participating with its own stance. (Toptaş, 2016: 8)

The ball of relationships, in which the author realizes with the "self" of everything, appears to be an essential condition for the life cycle, as opposed to being an obstacle to the continuation of one's life. A song accompanied by all living things in the world can only be continued in this way. The bodies of all human and non-human beings in this cycle constitute a place in the ecological sense, which requires the reshaping of the relationship between human-nature. Acceptance of existence only for human beings since he can perform the act of thinking, takes the right to "identity" from the hands of all living and non-human beings. Substance according to material transformation - for example stones, minerals, seas, bacteria, garbage, etc. everything- has ontological identity and feature of being subject (Oppermann, 2012: 37). This ontological identity and the state of being a subject; in story, are expressed by hornbeam with these lines: "*In other words, we were suffering, like people, we were sometimes upset, we were crying from time to time, like people, sometimes we were anxious, thinking and scared*." (Toptaş, 2016: 10).

For hornbeam, the main character of the book, which believes that it occupies at least as much space in nature as human beings, and explains this space occupation with a physical volume as well as its affective and emotional dimension, there are parts of a whole that makes human and physical environment inseparable, contrary to binary oppositions. This conception style destroys the validity of the ideology that dominates nature, and forces knowledge and existence to think together. In the work, the lines that describe the beauty that increases as they share among all the beings in nature are the proof of a reading that can be solved with a deep ecology consciousness, contrary to an observable knowledge:

I was like a lush poem that adds beauty to the beauty of the forest, according to the other trees living on the plain. This must be why, even the birds that landed on my shoulders and took off were rapidly becoming beautiful in those years. (Toptaş, 2016: 55).

The way of using language, which supports the idea that nature exhibits a dynamic vitality in the work, is established to defend that all living things and matter are organically active. According to this, "All living things, including humans, and all the building blocks of matter have a magical intrinsic value" (Oppermann, 2012: 36). The problem for eco-criticism, acting with this intrinsic value awareness, is not the emergence of differences, but the creation of a hierarchical order based on differences and the ignoring of the original cycle. Ecocriticism makes sub-readings to reveal this detail in the texts targeted. Hasan Ali Toptaş gives the key to this sub-reading, which he wants from the reader, in his work, which he writes with the awareness of the intrinsic value of the beings in nature. The writer emphasizes that everything has an identity far beyond what is seen with these sentences:

"*According to him, the thing called wind was not only wind… should know how to read it*." (Toptaş, 2016, 42) The things that those who have this secret of life will find in life are quite different from those who do not realize it:

Those who knew this could find almost everything about life in the wind ... Those who know how to read the wind could even taste the salt of a sea they have never seen if they so desire (Toptaş, 2016: 42).

"Individuals who start to question their self-potential also tend to identify themselves with the beings around them," in order to acquire this perspective and to realize themselves, which the author also mentioned (Dindar, 2012, 80). Eco-criticism, which does not forget that all discursive formations are privileged in line with the guidance of human beings, gives us the opportunity to question all our relations with nature. This is an important indicator to assimilate the "Live and Let Live!" principle of deep ecology (Dindar, 2012, 80). *I am a Hornbeam Branch* whispers to the reader that the act of “living” can perform only by only keep something alive, that the limits are far beyond what the human eye sees, with the following lines:

No matter how much we paid attention, we could not know which color gushed from and to whom it belonged. The pomegranate red blues, snow-white purples, pale yellows, and exile greens would stand around with a loud noise, and we just looked at them (Toptaş, 2016: 9).

These lines are indicators that both the attributes we give to nonhuman beings are at the simplest level and that the perfect balance of nature exists with a perfection that exceeds the power of all beings, including human beings and is another way of saying "I exist too!"

HUMAN VERSUS NATURE: "I" AND "OTHER"

People who adopt the wheel of consumption of the twenty-first century and continue to destroy nature with unbelievable speed, insensitivity, and unconsciousness, exhibit a ruthless attitude towards nature by seeing themselves at the center of moral values and authority. Humans have made their own subspecies into a hierarchical social structure by also classifying those who resemble themselves the most (Arıkan, 2011: 45). Thus, people think that they have the right to use everything that encompasses the "other" including human groups of undeveloped societies. This is because “*human is a strange puzzle that has not been solved for centuries, and it carries the unknown secret of a universe full of dirt and unique beauties*.” (Toptaş, 2016: 28).

As Toptaş says in his work, man has the will to extract the potential of "bad" and "good", but the desire to dominate and consume with an eternal passion pushes him farther than the understanding of being a part of nature. Epistemology based on dual understanding perceives the human body as “a mechanism detached from the ecosystem and superior to other living things” (Oppermann, 2006: 78). With such a perception, body politics, which places the human being at the center of creation, thinks the "other" as a property that can be controlled and used for all kinds of interests. For this reason, the bodies of all non-human creatures living, both symbolically and physically, were othered. The claim that they were created with a colonial mindset for human interests has been accepted as a so-called universal discourse in all human sciences (Oppermann, 2006: 78). The reflections of this discourse also affect the expression of the "others" in *I am a Hornbeam Branch*:

Most people could not see many beauties.
A large part could not touch many beauties.
They, like sleepwalkers, would pass by their beauty. Or while going after another beauty they have worn on their heads, for his sake, they would also ruthlessly crush many beauties under their feet without realizing it. (Toptaş, 2016: 29).

The "others" in the work cannot make their voices heard due to the lack of superiority provided by "language". In the culture he has created, the human remains silent in the sense that the status of a "subject" who can speak is preserved only as a human privilege. “We are people who presumably must think of the world in terms of the learned categorical scheme of Modernism. It is as if we have compressed the entire buzzing, howling, gurgling biosphere into the narrow vocabulary of epistemology.” (Manes, 1996, as cited in Speek, 200: 159). In Toptaş's work, man is the subject of the world that has become deaf because he cannot or does not want to hear the screams of nature:

Then, in a voice sometimes angry, sometimes grief, sometimes distress, the oak would begin to tell us exactly what was happening below. As he says, from time to time, some men with executioner faces came to the bottom of the slope below… Then, these men were walking around with a wandering spirit, chewing the beautiful mountain flowers for a while… Of course, they never heard the screams of what they chewed and crushed. (Toptaş, 2016: 11).

The human mind must accept the fact that there cannot be an ecology devoid of nature, just as it cannot be without humans. For this reason, ecology wants to switch to monism instead of being a party to the oppositions imposed by dualism (Morton, 2007: 142). This transition is not the belief of the fake unity in which one wishes to be fully integrated, but a way of gaining more loyalty to "things" by accepting differences. Humankind should allow everything to be spontaneously explained, and not imprison them in various meanings and identities for the sake of their "instrumental values" (Garrard 2016: 55). The best way to do this is to use "language". Perhaps, for this reason, literature is one of the best methods of enabling the existence to be unfolded. Unless this

freedom is provided and this reality is discovered by man, "things" will not go beyond turning into things ready to be used when necessary. In this case, trees like hornbeam, who say "*I could not even want to be a crooked chair leg in a distant village cafe from a human being who holds the strings of my life*" (Toptaş, 2016: 32), can be revealed not as trees but as timber awaiting their fate.

Contrary to being deaf to the specific language of nature, "a comprehensive identity developed on taking responsibility rejects seeing nature as a different and "other" element." (Sarıkaya, 2012: 101) It pushes people to make a self-criticism and question the irresponsible behavior towards the environment by looking at the events with the "eye" of nature. This is where ecocriticism seeks to guide people: experiencing enlightenment by self-criticism and ultimately creating an ecological identity. Ecological literary criticism gives nature a chance to express itself, in a sense, makes nature speak and gives it a voice in what can be:

While I was thinking about all these options one by one, sometimes I also wanted to be a railway sleeper. Maybe if these trains were to carry happiness and beauty from one place to another, I could accept being a traverse without even shearing my leaves… But if long train trains would carry bullets day and night, if long train trains would carry prisoners or wounded and hungry soldiers, they should not use me neither in the construction of sleepers nor in the station buildings where those trains enter and exit with a loud noise ... (Toptaş, 2016: 32).

Through nature, which finds the right to express itself, instead of a divisive and marginalizing way of thinking, a "holistic ecosystem" approach that accepts differences is developed. Within the framework of an interdisciplinary relationship and information exchange, the task of a critic is to examine environmental issues that come to the fore in any text, whether literary or not, and the text's responses to ecological problems. The reactions of nature are conveyed in the story as follows: "*We were also hearing the screams of the felled trees rising towards the sky from where we were. Sometimes we even couldn't stand it and were crying quietly*." (Toptaş, 2016: 13).

Thanks to the understanding that the contrasts or differences between the world and the human body do not give any superiority to any species, diversity is considered as a wealth, so in eco-criticism, all the links of the chain find a place of their own in nature. Ecocriticism, which refuses to think of the environment as nothing but ideological blueprints or other human meanings, also prevents false consciousness from settling. While media, politics, or some literary works often have a landscape for formal, symbolic or ideological purposes, texts created with eco-criticism refuse to refer to a landscape, place, and natural world as an independent object of value for its own good (Speek, 2000: 167). It is possible to see an example of this in Toptaş's work:

"Well, what do people do when they cut?" I asked him. He said, "How can I know?" in a hesitant voice. "Probably they will use it for a purpose they set in their heads. They make the crooked ones into wood, for example, they cut them into large and small pieces and burn them in stoves or ovens. In a way, they warm up their hands with our death, cook their food and bread with our death. (Toptaş, 2016: 23).

IF I AM NONEXİSTENT, YOU ARE NONEXİSTENT TOO: "FEARS COME TRUE AND FAİRY TALE ENDS!"

The history of life on earth has also been the history of the interaction between living things and their environment. To a large extent, the physical form of the earth's vegetation and its habits and animal life have been shaped by the environment. However, in the time represented by the current century, there is a human who has gained significant power to change the nature of his world (Carson, 1962: 5).

The city created by the person who negatively sustains the change in *I Am a* Hornbeam is described as follows*; At dawn they passed the streets of a sizeable city that looks like a concrete forest. This was the city drowned in fog and smoke; Streets, avenues, boulevards, even squares writhed in pain to breathe.* (Toptaş, 2016: 51). This physical and spiritual exploitation triggers the consumption frenzy as the result of the mechanical worldview. "While biodiversity is rapidly declining and species disappear, human societies are trying to maintain a system that is based on economic and industrial growth along with social-economic-environmental injustice and exceeds the carrying capacity of the ecosystem" (Şen, 2018: 34). On the contrary, people now must strive to balance their needs with the demands of the ecosystem. Nature is aware of the value that her existence adds to her, but can develop her own transformation in line with a two-sided truth-based need:

Now I started the resistance with all my power, to not to be wood when I fall into the hands of people. Moreover, resisting anything has already beautified me. It gave my existence many meanings that I did not know. (Toptaş, 2016: 27).

In the work, the dreams of new formations for hornbeam, who can only forget about being detached from the soil for a useful reason and with another transformation that can make mankind happy, are listed as follows:

I was dreaming being of beautiful thing If I will going to be cut in any case in the future. For example, when I was slaughtered, let a peasant made a cradle from me. Let be my carvings, fine, embroideries, colors, and beads ... Or

if they are going to do something in any case, let me be a toy in a playground. In any district of any city, I wish I was a seesaw among flowers, benches, and swings, for instance. (Toptaş, 2016: 31).

For Hornbeam, the dream of new formations are attributed to an inherent value and the satisfaction of the soul is also taken into account with body, in the phenomenon called ecological crisis, an insatiable wheel is created at the production and consumption by creating false needs. This system, in which excessive wealth on the one hand and poverty and insufficient consumption prevail on the other, unless it starts to see people as responsible for the negative consequences and takes action as soon as possible, The power that man thinks he has will not be enough to repair the world. The main issue is this: the war that man thinks he wages against nature is in fact towards his own existence and he must discover the power to produce an alternative end. The key to this issue was found in the story:

What is called war, as the white-bearded oak once told me, would not begin and end anywhere on the earth.
Like everything else, it would begin with the human and end with the human.
So, the fronts were not on that mountain or on this plain.
The fronts were in human beings with all their cruelty. (Toptaş, 2016: 97)

"Well, wouldn't it be a garden of peace, the same person?" (Toptaş, 2016: 98), according to the hornbeam, who questioned a beneficial formation for all parties with this question, the state of the world is a harbinger of fatal consequences not only for nature but also for human beings. Rob Nixon (2011) discusses the concept of social and environmental justice in the context of the ecological struggles of the Third World in his "Slow Violence and the Environmentalism of the Poor". This scope is important to grasp the seriousness of the situation. The severity of delayed destruction, which takes place gradually and out of sight, spread over time and space, which Nixon defined as "slow violence", is a product of erosive violence with more serious consequences. "Slow violence", which has a different understanding from the traditional understanding of violence, which is perceived as a sudden and immediately noticed event, emphasizes what we should be dealing with. The temporal emphasis on slow violence, in which ecological struggles take place, allows us to center on not only the perceived violence, but also the representational difficulties and creative dilemmas that this incomprehensible change presents (Nixon, 2011: 13). The person who is the subject of violence is also affected as the injured person, the fact that the only entity is human that can prevent the destructiveness that takes place in time from turning into action, finds place in Toptaş's lines:

Only human could resist the cruelty of human, not trees and birds, insects and herbs, animals, and stones.
Everything was starting with a human and ending in a human.
The rest was empty…
So, everything that human did not get involved in was a fairy tale. (Toptaş, 2016: 65).

As the difficulties in the perception of environmental disasters that can occur with human will increase, the struggle against slow violence becomes more difficult. One of the most striking examples of "slow violence" is presented in the work. While the nature that cries to the pain of man despite his cruelty against nature is represented, the act of being "happy" that can only occur mutually and the state of being reborn are associated:

We were just looking at people's pain, doing nothing. There was nothing we could do other than feel *sorry and cry with them. So much so that if a drop of happiness fell on their faces, we could have green leaves at the foot of the courtyard wall.* (Toptaş, 2016: 86).

As underlined in the work, even though the revival of nature seems to depend only on physical and biological changes when viewed directly, an emotional meaning is sought under this revival. The reconstruction of the environment is always inevitably selective and changeable, and the world is passed through a series of filters - perceptual, ideological, and literary (Speek, 2000: 162). Regardless of these filters, the tendency to represent the environment as it appears is useless when used to show the green world as nothing but reflective. Texts written without mentioning the two-sided human-nature relationship become unable to give a green world message. Texts aiming to give an ecological message should be developed depending on the picture that can be analyzed from a holistic perspective, and the living things that the text deals with should adapt to their natural environment, otherwise they do not teach real ecological concepts and have the opposite effect. As a requirement of ecocriticism, "representations of nature that are not depicted in the same picture with humans, even if they are in their realistic and natural environment, is not sufficient reason to make it pro-environmental" (Baudreaux, 2006: 118). Of course, "nature exists independently of what we say about it, but it exists for us only as long as we say something about it" (Kovel, 2005, as cited in Şen, 2018: 43). In *I am a Hornbeam Branch*, while conveying the act of living an independent life from the human through the dream of Hornbeam, on the one hand, he attributes the process of making sense of his own existence to the fairy tales that people will tell: *Perhaps I was going to go to another tale, but that fairy tale had not been created yet ... Undoubtedly, I would fly away as soon as the tale that would tell about me was told*. (Toptaş, 2016: 19).

It would be misleading to exclude language from a social and historical discourse and to consider the

intended ecological consciousness apart from language. Therefore, literature plays an important role. Because “the trace left by man on nature has two layers; by affecting nature both concretely, reshaping and arranging it, the human species leaves its mark on every part of the earth and all propositions about the natural world are social statements ”(Şen, 2018: 43). The ways of talking about nature are expressed in language that has passed through the filter of culture and these come to life as social experiences. When it comes to nature, a language that requires not only social, cultural, and political discourses but also material discourses should be used. The acting force in the interaction of human bodies with the physical environment has the capacity to change social dynamics by causing the existing bodies to be restructured. The world has a much more intrinsic value than it seems, and continuity can only be achieved thanks to the cycle we accept that matter is also active. This state of continuity is expressed as the formation of a new production at the point where beauty is overflowing through, *I am a Hornbeam Branch*:

Well, was the fir, which first turned into the guitar, then the song, then into the waters and seeped into the presence of fish, was running out on the tables?
Does it ever happen?
Where can the creators of beauty be consumed, and by whom? (Toptaş, 2016: 47).

These lines are important to convey the intrinsic value of matter and to revive the acting nature of nature, which we consider ineffective. The role of material factors in change and transformation should also be considered, as social, cultural, and political discourses are not sufficient alone (Yazgünoğlu, 2012: 358). What humankind does is to glorify “human” with the discourses formed by beliefs and interests, and attribute all the negative results based on the destruction of nature to the body that is material despite human beings. In *I Am a Hornbeam Branch*, nature is a phenomenon presented as a reward despite the destruction of human beings, while the window made of wood on the grounds that it bridges the gap becomes a meaningful substance with this task. In other words, both man and matter only gain meaning if they are in contact with nature:

“It is best to be a window,” said Pine. “In this case, believe me, it is best to be a window… Because if every window looks inside with one side, it looks outside on the other. Even if he cannot see anything, at least he sees the sky. He sees birds, clouds, horizons, stars, rains, or snowflakes… (Toptaş, 2016: 74).

The linguistic transformation, which takes place with the emphasis on the active characteristic of matter, embraces the material transformation, leaves "language" to the center of all discourses and concludes that the world is formed by language. For example, in Toptaş's work, being "poor" is associated with the state of being deprived of both nature and human components. Language is thus set up on an eco-critical platform plane where material transformations are also supported: *The street was poor in all respects. Their footsteps were little if any, for example, their cats were few, their colors, lights, and plants were few. At the base of the whitewashed mud brick walls, there was neither a branch of flowers nor a winged insect…* (Toptaş, 2016: 71).

When we see the nonexistence and poverty of nature as a threat to our own self, we will have a more durable way to justify this relationship. In eco-criticism, it is aimed to create a consciousness where we perceive the fact that what is different from us must also live:

The principle of "live and let live" aims at a democracy and classless society where we can speak of justice not only for humans but also for animals, plants, and the environment. This idea also emphasizes that everything is interconnected and that our egos are an integral part of this attachment. With this totality, we, our egos, have an extremely limited power and role… By identifying ourselves with a larger part, we undertake an important task in the creation and preservation of this wholeness. We have a share in this magnificence. (from Naess 1989, Dindar, 2012: 80).

Actions against this consciousness will bring our own end along with the end of nature. In Toptaş's work, the hornbeam dreams of many things happening while driving behind a trailer, unaware of what will happen to him. Nonetheless, these dreams have no counterpart in his own fairy tale. While they were making young hornbeam gallows, his end was nothing more than a movement planned to bring about the end of a human:

However, things did not develop as I thought. I became neither a door nor a window in the prison workshop where I was taken away… I was cut and sawn, chipped, I became gallows. (Toptaş, 2016: 102).

For hornbeam, just like his friend fir, being wood is better than this painful ending. This is an end that can be used for a better purpose, as opposed to amplifying man's suffering at death. Thus, he does not want to end the tale as gallows and calls out to the *Beşparmak Mountains* where he once lived:

"Hey trees!" I shouted. “Hey hornbeams, pines, firs and oaks! Hey long-tailed foxes, o timid stepped rabbits! Hear me, o! mountains, stones! Hear me, mountain hyacinth! Hear me, oh lone bug wandering in the forest's nook! Hear me, birds that deepen the sky!
Hear me and don't know me as gallows from now on, "If I have a dry branch left in the plain behind the Beşparmak Mountains, now I'm a hornbeam branch! (Toptaş, 2016: 111).

CONCLUSION

The rich depiction of nature in Hasan Ali Toptaş's book contributes to the presentation of environmental destruction as a social problem and produce representations of the sense of "protection" based on ecological consciousness. From the beginning to the end of the story, the interaction between man and the environment is constructed as a problem for both humans and nature. These problems are referred to not only as problems of nature, but also as social, psychological, and cultural problems that negatively affect all components of the earth. Environmental problems are presented both textually and pictorially using ecological language. In addition to presenting ecological concepts, the book sets the story in a natural environment and places the interaction between the environment and people on a natural basis. The trees depicted in the book offer the reader an opportunity to empathize, since we listen to the story from the hornbeam, instead of making an unreal effect on the reader. In this way, the awareness of children is transferred through hornbeam. Throughout the story, it is seen that the intrinsic value of nature is preserved. The general purpose produced in the book is the call to return to nature and the effort to realize the nature with a deep understanding of ecology emphasizing the wonders of nature and the inner values of nature. As a negative criticism of this book, the fact that hornbeam and other trees in the book, despite all the misbehavior of the human being, imagine the transformation as substances that are constantly offered to human service, is sustained in the idea that nature is an infinite resource for human use.

With this study, the ways of thinking on the solely non-monologue representations of the natural world is discussed. It is seen that the writer is aware of the ecological language he uses to remove the reader from his shell. This study also focuses on the way that the foundations that people derive from the natural world are shaped by the influence of learning, culture, and experience, despite their presumed biological origins. Considering the vital role of the ecological consciousness in childhood, "hornbeam" combined with a child's mind and discourses that can be developed through the nature it represents are emphasized. Eco-writing has the power to increase environmental literacy in the form of children's literature. For this reason, creating a literature that can be enriched and that can make children feel the inherent values of the world we live in and making reading suggestions from this literature can motivate children to establish a relationship with the environment and to develop their knowledge about environmental concepts. Considering that the recent ecological crisis and the next years may have more difficult consequences at this point, it is necessary to raise the awareness of children about the current situation and the protection of the environment. An environmentally conscious writer and a reader growing up from childhood refuses to allow phenomena such as reason, language, and culture to determine what nature might be. Eco-critical readings reflect our noisy meanings as well as the unique voice of the nature in literature by offering alternative discourses that suggest what beings in nature can see.

Cultural ideologies presented to children about the environment clearly shape their cognitions, perceptions, attitudes, and behavior towards the world. For this reason, it is necessary to establish images, texts, and ideologies in relation to nature and in a non-anthropocentric way through children's literature. Unless we can provide a good reading opportunity to inculcate the values of environmental movement through children's literature, we will not be able to raise individuals with ecological identity and ideas. The important thing is not to reflect what is popular through magazines, stories, and the media, but to convey pro-naturalistic thoughts to children as values. “The environmental literature that children acquire has the capacity to make profound, lasting effects that appeal to both emotions and intelligence” (Gaard, 2009: 328). In this direction, as in *I am a Hornbeam Branch*, it must be priority to establish children's literature with works that aim to imagine non-human life worlds from the point of view of creatures, generally not as a field of absolute differences, but as a parallel universe that reflects back to human and interacts with human actors.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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The impact of the ein supported math education on students' achievement and opinions in 5th grade geometry teaching

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The aim of this study is to observe the effect of Education and Informatics Net (EIN) supported math teaching on students' success in geometry teaching 5th grade level and to observe students' comments on EIN. This study was conducted in the 2nd term of 2018-2019 school year. Both qualitative and quantitative research methods were implemented. Pre-test and post-test controlled grouped quasi-experimental design was used in the research's quantitative part. While 5th grade geometry subjects were taught via course books and concrete materials to one group, the other group was exposed to EIN supported math teaching methods. The research sample is limited, comprising Giresun city, 34 secondary school students, of whom 17 each were for the experimental and control group. An achievement test consists of 25 questions was developed by the researcher and its validity and reliability were checked by experts in the field. The achievement test was implemented through both groups as pre-test, post-test and permanency test after 8 weeks. The collected data was administered through SPSS 24.0 package program. Paired t-test and unpaired t-test were used to analyze the collected data. Students were asked to answer the beforehand prepared feedback form that consists of questions about the use of EIN in the qualitative part of the research. When the quantitative data results are analyzed, both of the groups had succeeded in learning 5th grade geometry subjects. However, it is seen that experimental group students are more successful than the ones in control group. Permanent learning happened in both of the groups. In addition, it is clear that students have positive attitudes towards EIN according to qualitative data results.

Key words: Educational Informatics Network (EBA), 5th grade geometry teaching, geometry.

INTRODUCTION

Recently, in addition to the rapid developments in science and technology, educational programs have been constantly renewed and have undergone new changes in order to carry out contemporary teaching models. These innovations in educational programs aim to make the students more active in teaching environments. While

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technology is taking place in all areas of our lives, it has become inevitablein the field of education as well. Considering that learning knowledge by hearing does not maket it permanent knowledge for students, Mathematics education is supported by technology, visualizing knowledge during learning process and having students try to access it by themselves makes a more permanent learning for them.

Likeall other parts of the World, in our country -beside the new instructional approaches, the power of technology is utilized in order to solve the problems faced in education “With the rapid development and change in technology and science, in many areas such as economy, culture, politics and education, the expectations vary according to the society we live in. In the light of these developments, especially in the world of education, severe differences have been experienced, important information about how individuals learn has been reached, and various new approaches have been developed to respond to the needs of the society” (Doruk, 2010). In this context, the purpose of education is "to train people who are constantly learning, who can apply the knowledge they have learned, who can think critically and have problem solving skills, who can produce new ideas, find solutions, and who are not unfamiliar with innovations” (Olkun and Toluk, 2003). In terms of mathematics education, it is expected from mathematics educators to raise individuals who are able to produce effective solutions in real problematic situations, associate the mathematical knowledge they’ve learnt with their daily life,who are aware that the mathematics and the world they live in are a whole, and consequently, who love mathematics andare not afraid of it (Çiltaş and Yılmaz, 2013). “Mathematics emerged parallel with the needs of society -with counting and measuring, and today it, especially with its frequent use in technology, has gained an important place among other sciences” (Çiltaş, 2011). According to Altun (2008), the aim of mathematics teaching is to “provide a person with the mathematical knowledge and skills required by daily life, teach him/her how to solve problems and make him/her acquire a way of thinking that handles events in a problem-solving approach”.

Learner-oriented educational activities have an important place in modern learning approaches. In Turkey, Educational Informatics Network (EBA) developed by the Ministry of Education, provides significant benefits to educators and students in this regard (Bolat, 2016). Educational Informatics Network (EIN) is defined as “an online social education platform offered to individuals -free of charge, by the General Directorate of Innovation and Educational Technologies (EIN, 2016). Today, EIN, which includes many services for education, is highly used by primary and secondary school students. EINstarted to broadcast in 2012, became enriched by being renewed for changing needs and became the world's largest content service. It seems that “the EIN system was used by 10 million primary and secondary school students in the academic year of 2015-2016. The EIN is a system that includes educational contents in addition to educational tools that teachers and students can use.Including resources in video formats, in addition to resources with audio, text and picture formats, EIN is a system that supplies users with facilities such asuploading files, cloud storage, organizing competitions, lectures suitable for various levels, making announcements and doing other kinds of sharings by users. These possibilities are only some of the features that enrich the EIN system (Aktay and Keskin, 2016).

The previous research shows that EIN has positiev effect on learning math, students who were taught using had higher level of learnings (Artun et al., 2018) also the students were more succesful in various subjects (Hastürk and Ballıell, 2018), and it faciliated learning proving to be a more efficious way of teaching. Lastly, the research provided evidence that it increased spatial ability in terms of math teaching (Özlü, 2014).

E-contents in the EIN should address to different learning styles. One of these is visual ability. Spatial ability is linked to many areas related to daily life. High level visual ability is also associated with formations and productivity in art, science and mathematics. Famous physicists (Albert Einstein, Newton) who succeed new inventions (Richard Stallman and Linus Torvalds) and scientists (Aziz Sancar, Feynman, Pascal) have also succeeded with their advanced spatial abilities, and stated that this ability was an important factor in their most impressive formations. Although there are contradictory situations in the studies regarding to what extent spatial ability can be improved and developed, many studies have shown that spatial ability can be developed through education when the appropriate environment and materials are given” (Olkun, 2003: 40). It is stated that the activities in the curriculum are not sufficient to improve spatial abilities as a result of the studies conducted in our country (Kayhan, 2005; Turğut, 2007; Kakmacı, 2009). For this reason, there is a need for new scientific products to improve spatial abilities. Turğut (2007) reached the conclusion that the level of spatial skills is not high in his study on students at the second level of primary education. For this reason, students need different learning approaches for their developmental situations, activities and acquisitions appropriate to the contents. It is believed that EIN supported math teachings would be more effective and efficous as it has been proven to support learning and increase spatial ability of students. Because it provides more oppurtunities for learning.

Problem

The main problem of this study is "In 5th grade Geometry Teaching, does the teaching by using the Educational

Table 1. Experimental design of the study.

Groups	Preliminary measurements	Applications	Final measurements
Experimental group	Mathematical achievement test (Pretest)	Activities for EIN	Mathematical achievement test (Post-test) Semi-structured interview form
Control group	Mathematical achievement test (Pretest)	Applications for the MoNE program	Mathematical achievement test (Post-test)

Table 2. Distribution of students in the experimental and control groups by gender.

Gender	Experimental Group (Learning according to EIN-supported approach)	Control group (Traditional learning)	Total
Female	8	7	15
Male	9	10	19
Total	17	17	34

Informatics Network (EIN) system and traditional methods have an effect on the academic success of students?"

The sub-problems

1. Is there a statistically significant difference between the pretest scores of the experimental and control groups?
2. Is there a statistically significant difference between the post-test scores of the experimental and control groups?
3. Is there a statistically significant difference between the pretest and post-test scores of the experimental group?
4. Is there a statistically significant difference between the pretest and post-test scores of the control group?
5. What are the opinions of the students of the experimental group, who do the EIN-supported practices for the geometrysubjects in the 5th grade, about the EIN activities, geometry teaching, and practices?

METHODOLOGY

In this study, quantitative and qualitative research methods were used together. Therefore, the research method is a mixed research method. Creswell (2008) defines the mixed research method as a procedure for collecting and analyzing qualitative and quantitative data in a mixed way at the stages of the relevant research process in order to fully understand a research problem. Creswell (2017) determined three basic mixed-method patterns in mixed research methods in accordance with the purpose. In this research, an explanatory sequential pattern from these designs was used. In explanatory sequential research studies, quantitative data are collected first, and qualitative data are collected and analyzed in order to examine the results obtained from quantitative data in depth (Mc Millan and Schumacher, 2010). In this study, first, quantitative data were collected in order to determine the learning levels of 5th-grade students about geometry subjects, and then the results obtained in the light of the collected qualitative data were examined in depth.

The research was conducted by choosing one of the two equal branches as the experimental group and the other as the control group. During the research process, applications were conducted before and after the research in both groups. The research design is shown in Table 1. After the application, interviews were made with the students in the experimental group using the interview form prepared. An interview is defined as communicating with people for specific purposes. The main purpose of the interview is to reveal the feelings, thoughts, and beliefs of the individual interviewed about the subject being studied (Çepni, 2010: 51). For this reason, interviews were conducted to learn the thoughts of the students about the EIN-supported Geometry Teaching after the application.

Participants

Necessary legal permissions for the research were obtained from the Giresun Provincial Directorate of National Education. The universe of this research consisted of 2nd-level primary education students in Giresun. The sample of the study consisted of 6-H and 6-E classes in the 15 Temmuz Imam HatipIntermediate School in the Central district of the province of Giresun in the second semester of the 2018-2019 academic year. In the sample, there were 34 students in total, 17 students in 5-E class that made up the experimental group, and 17 students in 5-F class that made up the control group. The distribution of the students by gender in the experimental and control groups is given in Table 2.

Data collection tools

The following data collection tools were used to collect data in this study.

(1) Mathematical achievement test
(2) Semi-structured interview form

Mathematical achievement test

In order to measure the success of the participating students concerning the geometry subjects, an achievement test included geometry subjects was created. Since themathmatical achievement test was going to be held in a class time duration (40 min), it wasdecided to be consisted of 25 test questions. Therefore, a test of 40 questions, consisted of questions applied in the Scholarship

Examinations by the Ministry of National Education (MoNE) in the previous years and in the 5th grade acquisition comprehension tests recently broadcasted on the official website of the MoNE, was created. In order to ensure the content validity of the mathematical achievement test, the opinions of 1 expert in the field of mathematics education and 4 mathematics teachers were taken. The pilot application of the achievement test was carried out with a total of 100 students who had been taught the geometry subjects in the previous year. The answers given by each student to the questions were recorded one by one, and the discrimination powers (d) of the questions were calculated. The distribution of the discrimination power of the items in the test is shown in Table 1.

The semi-structured interview form

In the research, after the application, a Semi-Structured Interview Form was prepared in order to find out the students' opinions about the EIN-supported Teaching Activities. Before preparing the interview form in the research, the documents used in the studies on EIN-supported education were examined. As a result of the examination, a draft interview form was prepared from the documents obtained using the observations of the researcher during the application, secondary school mathematics textbooks, and the mistakes made by the students during the application. This interview form was then discussed with three academicians who were experts in their fields and two math teachers. Before the semi-structured interview form was applied to the students in the experimental group, a pilot study was conducted with 3 students, who were not members of the experimental group, on the clarity and comprehensibility of the interview items and the adequacy of the 15-20 min time allocated for the interview. The final version of the interview form was created by eliminating the identified deficiencies in all the interviews and making the necessary arrangements. In the interview form, questions about the place of the EIN approach and other approaches in the current mathematics curriculum, the applicability of the in-class activities and the approaches offered by the program, and the students' opinions about the EIN-supported teaching were included.

Application process

The following procedures were applied respectively to both the experimental and control groups in the study.

1. Academic achievement tests and semi-structured interview form, which were the data collection tools of the research, were prepared.
2. For the application, a permit application was made to the GiresunDirectorate of National Education through Giresun University Institute of Educational Sciences, and necessary permissions were obtained.
3. The experimental and control groups of the students studying in the 5th-grade branches in the school where the application would be held were determined by the neutral assignment method.
4. Before starting the application, teaching materials were prepared in accordance with the objectives and target behaviors of the geometry course.
5. Before starting the application, monthly course hours were determined in the experimental and control groups, and the total course hours recommended by the Ministry of Education were followed.
6. The mathematical achievement test was applied as a pretest to the experimental and control groups.
7. Teaching techniques suitable for the EIN-supported teachingtechniques were used in the experimental groups. In the control groups, traditional teaching methods, i.e. lecturing and question-answer techniques were used.
8. All subjects were taught to the experimental and control groups by the researcher.
9. After the application, the academic achievement test was applied to both groups as a post-test.
10. All quantitative data obtained were analyzed.
11. After the application, interviews were made with randomly selected students in the experimental group. The qualitative data obtained were analyzed.

Data analysis

The analysis of the results obtained in the research was made as follows:

Analysis of quantitative data

SPSS package program was used to analyze the data. All the data obtained were entered into the program, and necessary measurements were made. To determine whether there was a significant difference in the comparison of pre-test, post-test, and retention test results of the experimental group and the control group, *t-Test for Independent Groups* was used. To determine whether there was a significant difference in the comparison of the pre-test and post-test results of the experimental group and the control group and the post-test retention test results, *t-Test for Dependent Groups* was used.

Analysis of quantitative data

The content analysis method was used to analyze the students' views about teaching according to the EIN-supported teaching. Büyüköztürk et al. (2008) describe content analysis as a systematic, renewable technique in which some words of a text are summarized with smaller content categories through coding based on certain rules. In the content analysis, the collected data are firstly listed, then the themes are determined, and finally, the themes are organized (Yıldırım and Şimşek, 2011).

RESULTS

This study used a mixed method research design that included quantitative and qualitative analysis that lead discussion as show in Figure 1.

Results regarding the first sub-problem

Since the number of observations in the experimental group was 17 in the normality test performed with the data related to the first sub-problem, the Shapiro-Wilk analysis was performed, and it was found that the p-value indicated by the significance level was 0.508. Since the number of observations in the control group was 17 in the normality test performed with the data related to the first sub-problem, the Shapiro-Wilk analysis was performed again, and it was observed that the p-value indicated by the significance level was 0.145. The results of the t-test for independent groups are shown in the Table 4. Effect sizes are shown in table 3.

In the t-test conducted to determine whether there was a significant difference between the pretest results of the

Figure 1. Mixed method research design.

Table 3. Distribution of items according to discrimination power for mathematical achievement test.

Discrimination power	Number of Items	Percentage	Evaluation
d > 0.40	6	24	Very good
0.30 > d > 0.39	8	32	Fairly good
0.20 > d > 0.29	11	44	Need to be corrected

Table 4. Test results regarding the pretest results of the groups.

Groups	N	$\bar{X}$	S	sd	t	p	Effect (d)
Experimental	17	9,59	2.526	32	0.410	0.684*	0.21
Control	17	9.88	1.536				

*p<0.05 significant.

Table 5. Test results regarding the post-test scores of the groups.

Groups	N	$\bar{X}$	S	sd	t	p	Effect (d)
Experimental	17	12.76	4.085	32	1.355	0.022*	0.55
Control	17	11.18	2.58				

*p<0.05 significant.

experimental group students and the control group students, no significant difference was observed between the average test score of the students in the experimental group ($\bar{X}_{experimental}$ = 9.59) and the average test score of the students in the control group ($\bar{X}_{control}$ = 9.88), [$t_{(35)}$ = 0.410, p>0.05]. In this case, it can be said that the students in the experimental and control groups before the application were at the same level.

Results regarding the second sub-problem

The second sub-problem of the study asked "Is there a statistically significant difference between the pre-test and post-test scores of the experimental group?" Since the number of observations was 17 in the normality test performed with the data related to the second sub-problem, the Shapiro-Wilk analysis was performed, and it was found that the p-value indicated by the significance level was 0.08. According to Can (2017: 89), the fact that the p value is greater than 0.05 (accepting the absence hypothesis as "there is no difference with the normal distribution") means that normality is achieved. The result of the normality test shows that the t-test can be performed for related samples, which is a parametric test. The results of the t-test for independent groups are shown in Table 5.

In the t-test conducted to determine whether there was a significant difference between the post-test results of the experimental group students and the control group students, a significant difference was observed between the average test score of the students in the experimental group ($\bar{X}_{experimental}$ = 12.76) and the average test score of the students in the control group ($\bar{X}_{control}$ = 11.18), [$t_{(35)}$ = 1.355, p<0.05]. When the test averages of the groups are examined, it is seen that the students in the experimental group to whom the EIN method was applied were more successful in 5th-grade geometric subjects than the students in the control group who were taught with the traditional method. The effect size of this

Table 6. Test results regarding the experimental group's pretest and post-test scores.

Measurement	N	$\bar{X}$	S	sd	t	p	Effect (d)
Pretest	17	9.59	2.526	16	-7.374	0.000*	4.15
Post-test	17	12.76	4.085				

*p<0.05 significant.

Table 7. T-Test results for dependent groups regarding the control group's pretest and post-Test Scores.

Measurement	N	$\bar{X}$	S	sd	t	p	Effect (d)
Pretest	17	9.88	1.536	16	-3.928	0.000*	1.71
Post-test	17	11.18	5.253				

*p<0.05 significant.

success ($d = t.\sqrt{\frac{N1+N2}{N1.N2}}$) was calculated as 0.55. This shows that the difference in achievement between the students in the experimental group and the students in the control group is medium.This finding is in line with previous findings indicating the EIN supported teaching increases the students`learnings (Balliel, 2018)

Results regarding the third sub-problem

Since the number of observations in the normality test conducted with the third sub-problem was 17, the Shapiro-Wilk analysis was performed, and it was found that the p-value indicated by the significance level was 0.08. The results of the t-test for dependent groups are shown in the Table 6. As a result of the t-test for dependent groups conducted to determine whether there was a significant difference between the pretest and post-test scores applied to the students in the experimental group, a significant difference was observed between the average pretest score ($\bar{X}$= 9.59) and the average post-test score after the application ($\bar{X}$= 12.76) [$t_{(20)}$ = -7.374, p<0.05]. The effect size calculated according to the test result (d = 4.15) shows that this difference is at a high level. In general, in terms of the value of d, a value above one is interpreted as very large, while 0.8 is referred to as large, 0.5 medium, and 0.2 small (little) effects (Taşpınar, 2017: 57). In this case, it can be interpreted that teaching with the realistic mathematics education method in the aforementioned group had a significant effect on the test success of the students. This finding is in line with previous findings indicating the EIN supported teaching increases the students`learnings (Hastürk and Balliel, 2018).

Results regarding the fourth sub-problem

Since the number of observations in the normality test conducted for the third sub-problem was 17, the Shapiro-Wilk analysis was performed, and it was found that the p-value indicated by the significance level was 0.103. The results of the t-test for dependent groups are shown in the Table 7. As a result of the t-test for dependent groups conducted to determine whether there was a significant difference between the pretest and post-test scores applied to the students in the control group, a significant difference was observed between the average pretest score ($\bar{X}$= 9.88) and the average post-test score after the application ($\bar{X}$= 111.18) [$t_{(15)}$ = -3.928, p<0.05]. The effect size calculated according to the test result (d = 1.71) shows that this difference is at a high level. In this case, it can be interpreted that teaching with traditional methods applied in the aforementioned group had a significant effect on students' test success.This finding is in line with previous findings indicating the EIN supported teaching increases the students`learnings (Hastürk and Balliel, 2018).

Results regarding the fifth sub-problem

The fifth sub-problem of the research is consist of the experimental group students' opinions, in the 5th grade classrroms in which the EIN-supported applications on geometry subjects done, on the use of EIN, its contents, its dissemination, the adequacy of the contents and the EIN supported lectures.After the activities carried out with the students in the experimental group with the method supported by EIN, the students' opinions were taken by applying the semi-structured interview form in Annex developed by the researcher. Students' opinions taken with open-ended questions were examined and evaluated separately. These questions and the answers given by the students to these questions are shown below in tables.

Question 1: What are your opinions on the ease of use of the EIN platform?

Table 8. The responses given by the participants to Question 1.

Participants	Views
P_1	Comfortable, easy
P_2	Comfortable, easy
P_3	Difficult
P_4	Comfortable, easy
P_5	Comfortable, easy
P_6	Easy
P_7	While signing in I'm asked to submit information that I don't know
P_8	Easy
P_9	Comfortable, easy
P_{10}	Easy
P_{11}	I can sign in on every device connected to the internet
P_{12}	At First it was difficult, but it is easier when get familiar.

Table 9. The responses given by the participants to Question 2.

Pariticipant	Views
P_1	Made it easier, the exercises made me understand the subject
P_2	It made me to revise the subject easily
P_3	Videos made me understand the subject better
P_4	It didn't make it easier; videos are inadequate
P_5	I grabbed the minor details that I didn't understand
P_6	Subjects are more enjoyable and more entertaining
P_7	I play games on EIN when I give a break. It becomes more entertaining and more tutorial
P_8	It makes the subject more difficult; the activities are inadequate
P_9	It makes the subject easier, there are tests and lectures
P_{10}	It doesn't make it easier because lectures are too bad
P_{11}	It doesn't make it easier because I understand the subjects
P_{12}	It makes the subject easier because it lectures like a teacher.

The responses given by the participants to Question 1 are presented in Table 8. When Table 8 is examined, the views of most students using the EIN about the EIN are that it is comfortable and easy to use. On the other hand, 25% of the students stated that they had difficulty with signing in the EIN, and some were asked to submit their identity card Vol number. Some students complained that the videos freeze while watching.

Some of the participants' views about the EIN are as follow:

P3: I think the EIN is the best application made for students. Students have fun and they learn. What else could anyone ask for?

Question 2: What do you think about using EBA contents while learning a subject makes it easier for you to understand the subject or not? Why?

The responses given by the participants to Question 2 are presented in Table 9.

When Table 10 is examined, it can be seen that the use of the EIN in forming the acquisitions facilitates most of the students learning. It was stated that the lecture videos, tests and educational games in the EIN facilitate comprehensing the subjecs better and it is a good tool to revise the subject. Some of the participants' views on this question are as follows:

P4: Since I understand my subjects, I sign in the EIN a little. That's why it does not make it very easy. I usually use it when the teachers give homework.

Question 3: What are your views on disseminating the classes to be given by using the EIN contents?

(a) It should be disseminated because...

(b) It shouldn't be disseminated because...

The responses given by the participants to Question 3 are presented in Table 10.

When Table 11 is examined, it is seen that some of the students stated that the courses made using EBA contents should be generalized and some stated that it

Table 10. The responses given by the participants to Question 3.

Participants	Views
P_1	Useful
P_2	Enjoyable, entertaining
P_3	Make the subject revisable
P_4	Easy, understandable
P_5	Fast accessibility
P_6	Visually interesting
P_7	Different ways of lecturing
P_8	Using the time more efficiently
P_9	Memorisable
P_{10}	Videos of lectures are inadequate
P_{11}	Make it difficult to learn during the classes.
P_{12}	Lectures are too bad

Table 11. Tthe responses to the option a of the question 4 in the interview form.

Participants	Views
P_1	Yes, sufficient
P_2	Yes, sufficient
P_3	Yes, sufficient
P_4	Yes, sufficient
P_5	Yes, sufficient
P_6	Yes, sufficient
P_7	Yes, sufficient
P_8	Yes, sufficient
P_9	Yes, sufficient
P_{10}	No, not sufficient
P_{11}	No, not sufficient
P_{12}	No, not sufficient

was unnecessary.
Some of the participants' views on this question are as follows:
P6: It should not be disseminated because some children may enter unsuitable websites lying that they are studying at the EIN.
P5: It should be disseminated. There should be more lecture videos and the topics should be lectured in more details as our teachers lecture. So we can solve test questions better.

Question 4: Do you think the knowledge on the EIN related to this subject is sufficient?
The responses given by the participants to Question 4 are presented in Tables 11 and 12.
When the tables are examined, it is seen that the students do not have a weighted opinion about the content of lecturing on the EIN supported geometry teaching. It can be declared that the exercises part in the EIN is found insufficient by most of the students.
Some of the students' responses to this question are as follows:
P6: Lecture is enough because there are 8-10 videos on a topic. The number of exercises need to be increased and the examples should not be that simple.

Question 5: If this subject was lectured without the EIN contents, what would be the difference between the two types of learning approaches? Explain.
The responses given by the participants to Question 5 are presented in Table 13. When Table 13 is examined, it is seen that subject teaching by the EIN supported approach is beneficial for students. Some of the students stated that they learnthe subject faster thanks to the EIN; if the EIN was not in use, it would take longer to learn the subject and they would not be able to complete the subject deficiencies. However, some of them stated that lectures by their own teachers are better and the EIN is

Table 12. Tthe responses to the option b of the question 4 in the interview form.

Participants	Views
P_1	Yes, sufficient
P_2	No, not sufficient
P_3	No, not sufficient
P_4	No, not sufficient
P_5	Yes, sufficient
P_6	No, not sufficient
P_7	Yes, sufficient
P_8	No, not sufficient
P_9	Yes, sufficient
P_{10}	No, not sufficient
P_{11}	No, not sufficient
P_{12}	No, not sufficient

Table 13. The responses to the question 5 in the interview form.

Participants	Views
P_1	I would not be able to learn the subject quickly
P_2	It would be difficult to remember it
P_3	It would take long to learn it
P_4	With the wideos the subject is permanent on my mind
P_5	I would not remember the subject quickly while revising it
P_6	I would not be able to complete the subject deficiency
P_7	There wouldn't be any difference
P_8	It would take long to learn it
P_9	I would not be able to learn the subject quickly
P_{10}	I would not be able to complete the subject deficiency
P_{11}	I would not be able to complete the subject deficiency
P_{12}	There would not be any difference

not needed. Some of the students' responses to this question are as follows:

K3: Yes, there would be a difference. We would spend more time to learn the subjects, and we would have less time remain for other lessons.

As a result of the interviews, when the answers given by the students to the interview questions are examined in general, it can be said that all students find the EBA-supported method useful and they think that using this method in all lessons can improve themselves positively. Students generally stated that they had the opportunity to learn abstract concepts much better by having fun and exploring with the EBA-supported method. They also stated that this and similar methods should be used in other subjects and other lessons and that these methods should be generalized in a way that everyone can benefit from.

In this study, the effect of EBA-supported teaching on students' academic achievement in teaching 5th grade Geometry subjects was examined.

DISCUSSION

In the reasearch, correspondingly to what is aimed, the mathematical achievement test was applied to both groups as a pre-test in order to determine the prior knowledge of the experimental and control groups about the geometric objects. According to the analysis results, it was concluded that there was no statistically significant difference between the prior knowledge of geometry subjects of both groups. This result shows that the experimental and control groups in which the research was conducted are homogeneous, in other words they are identical.

In the research, geometry subjects were taught to both groups, and the mathematical achievement test was applied to both groups as a post-test after the teaching activity. According to the results of the analysis, it was determined that the average test scores of the experimental group in which the teaching was carried out by using the EBA-supported method, increased more

than the test score average of the control group where the teaching was carried out using the traditional method. Moreover, in the results of the analysis, it was determined that there was a statistically significant difference between the post-test avarage scores of both groups. Since the difference between the scores of the experimental group students is greater than the difference between the scores of the control group students, It can be concluded that the EBA supported method is more effective in teaching geometry subjects.

In the research, the mathematical achievement test was applied as a retention test to both groups 8 weeks after the application. According to the results of the analysis, no statistically significant difference was found between the post-test scores and the retention test scores of the experimental group students. This situation shows that the knowledge of the students in the experimental group about geometry, which they have learned by discoveringthemselves, is permanent. A statistically significant difference was found between the post-test scores of the control group students and their retention test scores. In this case, it can be said that the control group students' knowledge about geometry, which they learned with traditional teaching methods, is not permanent.

The results are in line with previous research. Considering the literature, in the study of Hastürk and Ballıel (2018), it was concluded that the students were more successful in the experimental group where the subjects were handled using the contents on the EIN. Artun et al. (2018) determined that the teaching using the EIN contents has a positive effect on students' learning. In their study, Eryılmaz and Salman (2014) found that using e-content during teaching subjects facilitates and quickens learning subjects. Turğut (2010) and Özlü (2014) concluded that teaching supported by technology improves spatial abilities of students.

As a result of the evaluation of the students data in the interview form, the students stated that it is not difficult to use EBA and that they do not have trouble when using the EIN. However, they said that they had problems while signing into the EIN system. The students expressed their views that during the teaching phase of the subject, the exercises in the EIN contents were useful to them that they used them to revise the topics, and the visuality of the contents was adequate. Moreover, it was determined that the students demanded the EIN-supported contents to be applied more in the classes. Some of the students thought that the exercises section in the EIN was insufficient, while others stated that the subjects section was insufficient. It was concluded that some of the students stated that they learned more easily with the EIN-supported teaching when some stated that it was useful to reinforce the subjects, the knowledge was more permanent because they were appealed to visuality, and the time they need for learning was shorter.

In the study by Tüysüz and Çümen (2016), students stated that it was beneficial to use the EIN to reinforce the subject, revise the subjects and prepare for the exams, and they were attracted with the contents. Aditionaly, they found that the students had occasional problems while sigining into the EIN system and the it took time to upload videos or cause some freezing problems with videos. Timur et al. (2017), in their study onthe EIN, researched the views of middle school students and concluded that most of the students use the EIN for revising the subjects and find the EIN system useful. Bertiz (2017), as well, in his study, conclueded that students stated theycould easily use the EIN and it was visually interesting to them. However, contrary to other studies, they stated that the system was not slow. In summary we can say that EIN supported teaching is more effective than general way of teahing, as it provides more oppurtunities for learning and interaction. In addition to it, the students indicated it made the topic easier and it is more enjoyful to attend the classs.

Suggestıons

The author suggests that the insufficiency of infrastructure and equipments in schools negatively effects the active use of the EIN in the classroom. For this reason, this problem in schools can be solved by eliminating internet connection problems. At the beginning of the semesters, brochures about the use of the EIN can be prepared and students can be informed about the EIN contents and applications. Also, the use of the EIN courses can be organized in the computer classes of the school or in public education centers for students who have difficulties while using the EIN. By giving information about the EIN to teacher candidates in Education Faculties at universities, they can be provided with subjectson increasing skills in developing e-contents and using technological tools. The EIN-related activities can be added to school books to makemore proactive use of the EIN. In addition to the EIN, similar applications such as geogebra and dynamic geometry software can be used to increase the impact of the EIN-supported geometry teaching. EBA-supported education can also be conducted at primary schooland secondary school level students. Comparisons can be made by applying similar studies in schools that accept students with or without an entry examination.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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The effectiveness of a proposed counseling program to develop self-confidence among Jordanian University students: The World Islamic Sciences and Education University as a model

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The present study aims at identifying the effectiveness of the proposed counseling program to develop self-confidence among the students of The World Islamic Sciences and Education University and to identify their level of self-confidence, as well as to find out if there are statistically significant differences between the average of the experimental group members on the pretest and on the posttest, for self-confidence. The study followed the semi-experimental method, where the experimental sample was 124 first year students of the Faculty of Education; they were randomly selected according to the course schedule. The tools of the study were a self-confidence questionnaire and proposed counseling program sessions to develop self-confidence. The results revealed statistically significant differences between the pre and posttests in favor of the posttest, which means the effectiveness of the proposed program for the development of self-confidence, while there were no differences between the two tests; the post and follow-up, which means the continuation of the effectiveness of the proposed program after two months of its application. Based on the findings reached, several recommendations were suggested, the most important of which is that the social and psychological counseling unit must hold more educational and psychological programs for the university students, and adopt the current program and re-apply the program continuously to the university students.

Key words: Counseling program, proposed counseling program, self-confidence.

INTRODUCTION

Self-confidence and success are two sides of a single coin. Success cannot be mentioned without confirming that this successful man is self-confident. Nor can we say that there is a failed person who has confidence in himself. Self-confidence is the first reason for success in life, because it means taking positive attitudes in your life (Al-Qasri, 2001).

Self-confidence is the key to success in life. Those who believe in themselves can do everything in life and who do not trust themselves cannot do anything at all. When

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we read the history of the successful people in life, they always believe in themselves, unlike the losers who did not raise their intellectual level to the stage of self-confidence, the best way to self-confidence is to believe that the individual has become a capable and responsible person in life (Aldosari, 2008).

Self-confidence has a remarkable effect. Men who trust themselves attract the attention of others by a large percentage and progress rapidly in their work (Al-Faqi, 2007).

On the other hand, self-confident people tend to explore and experience experiences. People who do not have this confidence tend to stay away from such experiences (Al-Natour, 2011).

Self-confidence, that is, the foundation of success does not come from a vacuum and cannot be invented or trying to imitate others. Individual can gain confidence when he gets rid of all the fears that try to inhibit the elements of success within it, they must have a strong sense of ability to succeed in what they want to do by doing business, and when thinking about something the individual must reawaken trust before starting the executive steps. The task of trust makes the individual rush towards the completion of the work without hesitation or fear, so that it is stripped of all negative aspects and elements of weakness (Aldosari, 2008).

What is the reason for the low confidence of most people themselves, despite the progress of science in all fields? What is the relationship between self-confidence and other psychological terms and concepts? Indeed, this was not the case, as Arab and foreign studies began to show self-confidence, either in the analytical descriptive approach (Al-Anzi, 2003), which decided to reveal the sub-components of self-confidence, (2004), which examined the relationship between scholastic achievement, self-confidence, and other studies. Studies on self-confidence are modern, which means the novelty of the term (Al-Anzi and Al-Kandari, 2004) itself and relatively recent spread among the educational community.

This led the researcher to proceed with the design of an orientation program to develop self-confidence among the students of the Islamic University in Gaza, not to mention the researcher's desire to go beyond the description and analysis to the most useful and to gain practical experience by thinking about the mechanism through which the researcher can help the weak. The self-confidence to overcome this crisis and to enjoy a high degree of self-confidence, through the methods and techniques and procedures included in the sessions of guidance, within the program is guided by the researcher and the preparation of its sessions after reading and diligent research and began in the love of aid in this problem to overcome them (Tabarani, 2002).

The problem of the study and its questions

The problem of the study is the main question: How effective is the proposed counseling program to enhance self-confidence among students at The World Islamic Sciences and Education University?
From this question, arise the following sub-questions:

(1) What is the level of self-confidence of the respondents?
(2) Are there statistically significant differences between the average scores of the experimental group on the pre-test and the average score on the post-test of self-confidence?
(3) Are there statistically significant differences between the average scores of the experimental group on the post-test and the average score on the follow-up test to measure the self-confidence?

Study hypotheses

Based on the study's questions, the hypotheses were represented in:

H_1. There were statistically significant differences between the mean scores of the experimental group on the pretest and posttest of self-confidence in favor of the post-test.
H_2. There were no statistically significant differences between the mean scores of the experimental group on the post-test and follow-up test of self-confidence.

Purpose of the study

This study aims to:

(1) Identify the effectiveness of the proposed counseling program to enhance self-confidence among students of The World Islamic Sciences and Education University.
(2) Identify the level of self-confidence among students of The World Islamic Sciences and Education University.
(3) Detect whether there were statistically significant differences between the experimental group scores on the tribal scale and their scores on the post-self-confidence scale.
(4) Detect whether there were statistically significant differences between the scores of the experimental group on both the post-scale and the self-confidence scale.

Definition of the study terms

Counseling program

Is an organized program organized in the light of scientific foundations to provide guidance service to all those included in the study (Abu Ghazala, 2000).

Self confidence

Self-confidence is defined procedurally as: "the ability of the individual to rely on himself, to make a decision, and to enjoy his determination, and his awareness of his social, academic and physical competence and investment in light of his trust in God".

The limits of the study

The researcher applied this study in the second semester of the academic year (2017/2018) to the students of The World Islamic Sciences and Education University by preparing the proposed guidance program to enhance self-confidence and use the self-confidence scale on a sample of 36 students who had the lowest grades on the confidence scale. The statistical calculus of the arithmetic averages and Wilcoxson test were used to detect differences between the averages.

LITERATURE REVIEW

The study of Amara and Abdel-Wahab (2016) aimed to verify the effectiveness of an emotional rational mentoring program to improve self-assertion and its impact in developing decision-making skills for Taif University students, using the experimental curriculum on a sample of 20 female students who applied the self-affirmation scale, the decision-making scale, and the advisory program, the results showed the effectiveness of the counseling program in improving self-assertion in developing decision-making skills among Taif University students.

Al-Rashidi (2011) study aimed at the effectiveness of a behavioral cognitive counseling program for developing self-confidence among primary school students in the city of Buraidah, where the research sample consisted of 40 primary school students in the city of Buraidah, from those with low scores on the self-confidence scale and they were divided into two groups (20 women and 20 experimental women). The researcher used the self-confidence scale prepared by Juliet Braille, translated by Mohamed Amr, and a behavioral knowledge counseling program to develop self-confidence prepared by the researcher. This results in the presence of statistically significant differences between the mean scores of the members of the experimental and control groups after applying the program in developing self-confidence, and the differences came in favor of the experimental group. And the effectiveness of the counseling program in developing self-confidence.

Juda study (2007) aimed to identify the levels of emotional intelligence, happiness and self-confidence of Al-Aqsa University students, and to identify the relationship between emotional intelligence and happiness and self-confidence, and the differences between the average of the sample in IQ, happiness and self-confidence, which can be attributed to gender, and the sample of the study was 231 students, including 85 students and 146 students, and the tools used are the scale of emotional intelligence prepared by Abdo and Othman (2002), and the scale of happiness (Argyle and Marton, 1995), modified by Abdul Khaliq, self-confidence scale modified by El-Sebaou (2003), and the study reached the result that the level of happiness was 63.16%, the level of self-confidence was 62.34%, and there was a positive correlation between emotional intelligence, happiness and self-confidence, and the no statistical significant differences in the study variables is due to the gender variable.

Kamel (2005) conducted a study and the study was designed to implement a rational and emotional guidance program to reduce stressful life events in the study sample, which consisted of 40 students from the second division, Educational Technology and Educational Media from the Faculty of Specific Education in Benha. The researcher designed his study tools, namely, the irrational ideas scale. The study showed that there is a positive relationship between irrational thoughts and stressful life events, and there are statistically significant differences between the male and female experimental group scores on the scale of the life pressure events in favor of the posttest, and the presence of statistically significant differences between the scores of the experimental group and control group differences in males and females separately on the events of stressful life posttest in favor of the dimensional scale, and the presence of those differences between the two scales of posttest and follow-up test in favor of follow-up.

Zahran (2003) conducted a study aimed at identifying the effectiveness of a rational, emotional, behavioral, group counseling program proposed to correct the feelings and beliefs of alienation among university students. The study consisted of 70 students, 35 experimental groups and 35 control groups. The researcher prepared a measure of feelings of alienation and a measure of beliefs, and the program of mental health guidance to correct feelings and beliefs of alienation. The study found a relationship between the feelings of alienation and the beliefs of alienation, and the effectiveness of the program to guide mental health (rational, emotional, and behavioral) in correcting feelings of alienation and beliefs.

Sharawi (2003) conducted a study, the purpose of the study was to investigate the effectiveness of a program in rational, emotional and behavioral guidance in improving the level of emotional equilibrium in the sample of the study which consisted of 40 persons, 20 males and 20 females of second year students from the Faculty of Education in Banha. The results showed a decrease in the level of impulsivity among the experimental group after application, as well as for females, and the

continued effectiveness of the pilot program in reducing the level of the experimental group after a period of time.

El-Sebaou (2003) conducted a study aimed at demonstrating the effectiveness of affirmative training for the development of affirmative behavior and social skills and its effects on some characteristics of the personality of the university youth. The sample consisted of 34 females, 14 males, 17 females and 7 males experimental sample and other 7 in the control group. The tools used were the affirmative training program and the affirmative behavior scale, both prepared by the researcher and the Arab list of optimism and pessimism prepared by Amara and Abdel (1996) and the list of five major factors of personality. The results of this study were the effectiveness of the affirmative training program and its effect on the behavior of the researcher, emphasis and on measured personality traits.

Mazrou's (2003) study aimed to identify the elements of psychological loneliness and the design of a mentoring program to reduce the sense of psychological loneliness in the sample of the study consisting of 20 students from the University of Umm Al-Qura and resident in the housing units of the university. The study tools were in the sense of psychological unity (Qashqush), the successive matrices (Raven), the socio-economic scale of the Saudi family (Ajlan) and the guidance program (researcher preparation). The results showed statistical significant differences between the average scores of the sample on the scale of the pre and post psychological unit in favor of the post, the differences were statistically significant.

DESIGN AND METHODOLOGY

Population of the study

The population of the study consisted of all students enrolling in The World Islamic Sciences and Education University during the academic year 2017/2018.

Study tools

The tools of the study are the self-confidence scale, used before the application of the guidance program and after the completion of its sessions.

Statistical methods

The researcher used a number of statistical methods: Gattman, Alpha Kornbach equation, arithmetic mean and Wilkinson test for differences between grade averages.

Procedures of the study

After intensive reading, the subject was chosen. Previous researches relating to the theoretical framework were studied. Because the subject self-confidence is new and there are lack of resources on this subject, information relating to self-esteem and self-assertion and personal competence were resorted to. The necessary statistical methods were implemented, and then the questionnaire was applied to the actual sample taken from the experimental sample. The Social and Psychological Counseling Unit also assisted the students' affairs. The program was verified using statistical methods needed. Two months after the completion of the application of the sessions of the program, it was applied again to obtain results for follow-up application.

RESULTS AND DISCUSSION

The main question of the study is, how effective is the proposed counseling program to enhance self-confidence among students at The World Islamic Sciences and Education University? The following questions emerged from it.

The first sub-question: What is the level of self-confidence of the respondents?

To answer this question, the arithmetic mean of the sample scores was calculated on the questionnaire, which was 81.38, with a standard deviation of 9.

This means that the level of self-confidence of the actual sample is higher than the average of the questionnaire, but not much higher. The highest default score for the questionnaire is 117, and the average is higher than the default average. However, this does not prevent the implementation of self-confidence sessions, and does not prevent interference to raise the level of students and develop self-confidence in them; to improve their personalities and raise them for the better, and make sure when talking that this proposed program is developmental, not preventive or therapeutic, the reason that the members of the sample gain such a degree to the method of parenting at home, which often distinguishes between the girl and the boy, and allows the boy and does not allow the girl, and may deprive the girl to do things permitted by the law, such as education and others, not to mention the words that parents are surprised by the girl if she wants to talk or express her opinion, like "be silent", you don't understand? Stay away, and don't interfere, and if she said: Why is my brother allowed and I am not allowed? They said to her: When you are a boy, we allow you to be like him, and the calamity is greater if the ruler of the family is the brother and not one of the parents, and more if the girl is the eldest and controlled by her younger brother, and hear from him words that reduce and destroy her morale, then she will lose confidence in herself.

The second sub-question: Are there statistically significant differences between the average scores of the experimental group on the pre-test and the average score on the post-test of self-confidence?

To answer this question, two hypotheses emerged.

Table 1. Mean differences between the average grade using the Wilcoxon test to detect the differences between pre and post measurement of the experimental group on the self-confidence questionnaire.

Group	N	Average self-confidence	Relative weight	Z value	Sig
Experimental sample before application	34	2052	5004	-3.061	0.002
Experimental sample after application	34	3089	7708		

The first hypothesis: There were statistically significant differences between the mean scores of the experimental group on the two tests pre/post of self-confidence in favor of the post-test

To determine the validity of this hypothesis, the researcher used a Wilcoxon T-statistic test. This test was used in the case of comparison between two small and coherent samples, and the result is shown in Table 1.

It is clear from the table that there are statistically significant differences between the grades for both the pre and post applications in favor of the post-application, which means the effectiveness of the counseling program. The researcher attributes these differences to the fact that the experimental group has received group counseling sessions in which many activities and in-depth discussions are based on scientific foundations for the development of self-confidence. The researcher believes that the development of self-confidence among university students is more difficult than developing them in the younger age groups of the university, because the undergraduate stage is characterized by the idea of the individual itself not being changed only by a mechanism considered scientifically and professionally, and this is what the researcher did, in which the participants were instructed to stand up accurately on the reasons for their low self-confidence. These reasons were due to the large number of negative instructions received by participants from their parents or those who performed their duties. In addition, many of them are frustrated, especially in high school, where they expect a high degree to allow entry to a particular subject, but surprise at a low rate is not allowed to join what they want, accompanied by harsh comments from parents, which worsens the bad situation, among the reasons also that some participants do not enjoy a required beauty, and the parents distinguish between them and their sisters in terms of physical beauty. These reasons were taken into account in the program sessions through scientific and practical knowledge on how to overcome this crisis. By following the guidance techniques scientifically studied proved effective in the field of counseling programs, starting from the dialogue and discussion that was inherent to each session of the program, which was of great importance in raising the level of self-confidence of participants. This was evidenced by their recognition that the subjects that were discussed in the sessions had a great impact on them extended to life in general, both in the university where participant can participate in the discussion and express her opinion without shame or fear, furthermore, people around her and companions have noted that.

Power Point presentations have been very attractive and useful in consolidating information and installed in the minds of the participants.

The drawing also was something new to the participants and unfamiliar, and was accepted by them despite the refusal and resistance of some of them initially.

There was therefore an effectiveness of the counseling program, and there were statistically significant differences between pre and post applications. This result is consistent with the results of several previous studies (Shaheen and Hamdi, 2008), whose program was designed to reduce the level of PTSD for students from the city of Ramallah, and El-Sebaoui (2003), which was in the development of positive training and its effectiveness on some personality traits, and other empirical studies.

The second hypothesis: There were no statistically significant differences between the mean scores of the experimental group on the post-test and follow-up test of self-confidence

The researcher used the Wilcoxon T-statistic test to compare the average grade of the experimental group members in the posttest and their mean scores in the follow-up measurement. The result is shown in Table 2.

It is clear from the table that there are no statistically significant differences between the two applications (pre/post) and the follow-up, which means the continued effectiveness of the proposed counseling program to develop self-confidence among students of the Islamic University in Gaza.

It is clear from the table that there are no statistically significant differences between the two applications. This means that the program will continue to be effective two months after the end of its implementation. This means the consistency of the result of the current study with many previous empirical studies, for example (Shaarawi, 2003).

The effectiveness of the program is due to the strength of its sessions, its solid scientific ground, its adoption of methods and techniques that are studied in practice, as explained earlier, and its design after a good knowledge of the subject and the characteristics of the university age.

Table 2. The significant differences between the average grade using the Wilcoxon test to detect the differences between the post-measurement and follow-up of the experimental group on the self-confidence questionnaire.

Group	N	Average self-confidence	Relative weight	Z value	Sig
Experimental sample posttest	34	3089	7708	-0.459	0.646
Experimental sample follow-up test	34	3088	7706		

RECOMMENDATIONS

Based on the findings in this study, the following are recommended:

(1) The Social and Psychological Counseling Unit must hold more educational and psychological programs for university students and adopt the current program.
(2) Re-apply the program constantly to university students.
(3) Attention to student problems and try to help students find alternatives and solutions to help them to overcome the obstacles they face.
(4) Holding seminars for parents on various topics on the methods of proper formation and how to develop self-confidence for their children in mental centers and institutions concerned with childhood.
(5) Holding seminars for university students on topics and issues of interest to them, such as how to choose a specialization and how to excel in the field of specialization.
(6) Activate the role of psychological counseling center in the Department of Psychology in a way that helps cover the huge volume of problems in the university and the community

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Academic freedom for special education faculty members in Jordanian universities from their perspective

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The study aims to identify academic freedom for faculty members majored in special education in Jordanian universities from their perspective. The study used the descriptive- analytical method, and a stratified random sample to represent the study population. The sample consisted of 40 members. The results showed that all the questionnaire fields were in moderate degree. Furthermore, there were statistical differences to the degree of academic freedom for faculty members due to the variable of experiences. The study recommended the importance of achieving academic freedom through developing ideas and seeking to fulfill goals for development.

Key words: Academic freedom, special education, Jordanian universities, academic staff.

INTRODUCTION

The university is one of the most important educational institutions and most relevant to society. Every community attaches its hopes and aspirations on them to serve its children and achieve their future vision. Academic freedom is one of the most important pillars of the university, and in support of its mission in the dissemination of science, culture and community service. The university cannot produce knowledge without academic freedom. Research centers cannot work and develop without it. In order for the university to reach its goals, university administrations should pay constant attention to the development and preparation of the faculty members and meet their needs and requirements, which can be satisfied only by providing academic freedom for him.

It is expected of the university, which is the first and most important operator of producing and developing ideas, to be the sole and preferred environment for freedom of expression, exchange and discussion of opinions and ideas in a calm environment full of transparency, freedom, tolerance and openness. Without calm atmosphere, there is no escape for the university to really lose its creative enlightening role and it will become a rickety workshop that only reproduces obsolete and fossilized old ideas (Suleiman, 2006).

In order for the university to fulfill its general

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responsibilities and functions of education, scientific research, community service and development, it must have administrative and financial autonomy. The university has legal rights to manage its own affairs and funds, as in advanced European and American models, a free, efficient, and developed society. Hence the restriction of the principle of autonomy of financial and administrative universities leads to serious results at the level of scientific research therein, and it violates its functions, objectives, and responsibilities. The independence of universities professionally, financially and administratively is the most important ingredient to ensure the availability of freedom of thought and creativity of knowledge and scientific and to protect the academic freedom of universities. It has been shown by the experiences of long-established universities in democratic countries, providing academic freedom and freedom of scientific research without any negative influences has contributed to the development of scientific research.

Pushing overall human development forward with important strides will result in a very important aspect; it advances society as a whole at production levels, promotes the introduction of advanced technology, and raises the standard of living and livelihood of the population (Thabit, 2009).

The proper application of freedom and democracy is a supreme demand that conforms to different human values such as freedom, justice, equality and participation in the widest possible way. It is this freedom that has led the first industrialized countries in the world to progress in all economic, social, cultural, educational and scientific fields. The development and progress of human societies is closely linked to the application of freedom and democracy, so that it becomes a way of life for all societies. This is only possible in civil societies based on freedom, democracy, institutionalism and pluralism (Jainini, 2010).

Academic freedom has important implications such as the absolute freedom of the teaching staff to change and develop curricula as needed and to develop standards and methods of teaching in accordance with the data of the stage and the freedom of the members to conduct the various researches they desire. With the principles of intellectual freedom and scientific research and ethics without any interference from censorship the faculty should carry out professional activities without hindrance from anyone in order to enhance their professional skills that enable them to finally apply this knowledge and achieve goals (Jackson, 2005).

Academic freedom will not be true, sound and practically applicable if faculty members are not given full freedom of research without outside interference. I is inconceivable that an institution's goal should be to increase and disseminate knowledge, while at the same time placing obstacles and limitations to freedom (Standler, 2000).

Academic freedom is characterized by self-confidence. And with the collective trust of the faculty, it works to develop the queen of creativity, motivates them for renewal, and raises the incentive for ambition to reflect and innovate. This in turn pushes them towards continuity in improving performance, which is a key requirement for graduating manpower to meet the requirements of the labor market and achieve sustainable development. The sense of academic freedom promotes faculty and students' affiliation to their colleges, and their universities, as well as their community. The faculty members of many prestigious universities have the freedom to teach their students what is useful for their intellectual, scientific and psychological development, and provide them with the skills, values and attitudes that prepare them to contribute to the development of their families and community. They have the freedom to research, investigate, experiment, seek truth, and employ knowledge, in addition to the right to participate actively in decision-making related in their areas of specialty. This also applies to students who are entitled to education, course selection, specialization and appropriate time (Al-Qarni, 2009).

The researcher assumes that special education is one of the specializations that are important to professors to obtain absolute freedom to develop students' abilities; to teach people with special needs and try to improve their potential. These have the greatest impact on society in alleviating the economic burden on families and preventing community deterioration.

The problem of the study

Academic freedom is one of the most important rights that a faculty member must have individually or collectively in our universities. Through it, knowledge is investigated, developed, improved, and utilized in order to achieve the objectives that serve the community, research, study, discussion, documentation, production, lecturing and writing without the intervention of any internal or external party. Focus is particularly binding on academic freedom at a time when democracy and freedom have become an important criterion for the development and progress of societies economically, culturally, socially and politically. This occurs in the current reality of academic freedom in the Arab world in general and Jordanian universities in particular.

Since the researcher has reviewed many previous studies on academic freedom in universities, and since the results are unsatisfactory according to the researcher, it is necessary to know the reality of academic freedom and develop educational bases to benefit the faculty members at the university. Therefore, it was necessary to address the issue of disclosing academic freedom among faculty members specialize in special education to know their academic freedom.

The purpose of the study and questions

The study aims at revealing the academic freedom of the faculty members specialize in special education in Jordanian universities from their point of view by answering the following questions:

1. What is the reality of academic freedom among faculty members in special education in Jordanian universities from their point of view?
2. Are there statistically significant differences at the level of significance (α ≤5.00) in the degree of the exercise of academic freedom among faculty members in special education in Jordanian universities from their point of view based on demographic variables (Gender, experience, and academic rank).

The significance of the study

The importance of this study lies in the knowledge of the reality of academic freedom for teachers of special education in our Jordanian universities in establishing educational bases for them. It is hoped that the results will be useful to the following:

1. Ministry of Higher Education in the Hashemite Kingdom of Jordan.
2. The decision-makers in the Jordanian universities, including directors, deputies and deans through the application of academic freedoms.
3. Faculty members in Jordanian universities for them to exercise their academic freedom.

Definition of terms

Academic freedom

It is defined as the freedom of a faculty member or researcher in Jordanian universities to access data sources and information. The exchange of ideas and opinions, and their dissemination without restriction (Khataibeh, 2004) will be measured through a tool designed for this purpose.

Special education

It is defined as a group of specialized educational programs, which are offered to groups of extraordinary individuals, in order to help them to develop their abilities to the fullest and help them to adapt (Al-Rousan, 2007).

Study limits and limitations

Limits

Spatial limits: The study is limited to a group of faculty members in Jordanian universities.

Time limits: The study was applied during the academic year 2017/2018.

Limitations

1. This study was applied to faculty members in special education.
2. This study was applied to the universities of the center, specialize in special education.

LITERATURE REVIEW

Theoretical framework

The subject of academic freedom in universities and higher education is a modern old subject; at the same time, it is one of the customs that have passed through time from generation to generation and which many world universities operate on. It is not different from the concept of academic freedom, and its content in the context of the academic environment. It means the total independence of universities administratively, financially, and allowing them freedom to conduct their affairs in accordance with scientific developments. It also means that the faculty member is free to teach, research, give feedback, and participate in relevant academic decisions. It also gives the students the right to freedom of choice, learning and education without discrimination and with the multiplicity of concepts of freedom; but it includes two main concepts between them (Al-Quarni, 2009):

1. Institutional Academic Freedom: It means the protection of universities from the pressure forces on their decisions, scientific, administrative and financial orientations. It also means the freedom of the university in the selection of faculty and admission of students, and the choice of vocabulary contents and curriculum decisions.
2. Academic freedom of professor: It means protecting faculty members in a department, college, or university from bullying and fighting an idea, or interfering with their teaching, and research inside and outside the university; the Dictionary (2009) study shows that in colleges and universities, the professors were given a great deal of freedom with regard to teaching their students what they deem appropriate and choosing the appropriate teaching method that does not contradict the vocabulary of the courses approved by the department to which they belong. They are free to evaluate their students without any guidance from any party. They are also entitled to conduct research and publish their results freely and without hesitation or fear. And because the basic purpose of the university or college in addition to teaching,

research and community service is to motivate, critique and transfer knowledge to students to stimulate and sharpen their creativity and mobilize them to reach the ultimate goal. And because all of these tasks are performed by a specialized body, we must have this body. We mean the teaching staff enough of the powers set and specific which enables them to exercise the freedom to carry out their educational tasks and responsibilities (Haider, 2008).

The importance of academic freedom

The importance of higher education institutions is highlighted from the fact that science is leading to economic progress, and that human society is going to be a scientific society, whereas the degree of development, urbanization and prosperity of nations is measured by their ability to produce and apply different knowledge and sciences. This ability is measured, among other things and criteria that are very important are measured by their academic freedom, financial, administrative independence, and academic; the faculty members are able to teach, research, invent, and publish without any tutelage. The historical march of nations and high educational institutions has emphasized the need to ensure academic freedoms, and to develop appropriate mechanisms that can be passed on to future generations. This is because academic freedom has become a norm and a part of the world heritage and we hope it becomes a part of our Arab heritage (Jalaluddin, 2009).

Academic freedom is essential for all societies to advance the process of transferring and applying knowledge. It is necessary to protect the university and its freedom from interference by government officials and and other forces in its operation, especially on issues related to the selection and admission of students, appointing or removing faculty members, determining the content of curricula and courses at the university, the size and rate of growth, establishing a balance and alignment between teaching, research and advanced studies, and selecting research projects and freedom of publication. In other words, academic freedom guarantees freedom of expression, freedom of action, freedom to disseminate information, freedom to conduct research, and the distribution and transfer of knowledge without restriction from any party (Ekundayo and Adedokun, 2009).

Academic freedom is an important issue to develop the capabilities of university students in general and students of special education in particular because these groups are important as they constitute a significant proportion in our Arab societies (Al-Rousan, 2007).

Previous studies

The following are the most prominent Arab and foreign studies that the researcher was able to view in chronological order: Orubit et al. (2012) conducted a study, entitled "University Independence, Academic Freedom and Conflicts of the Union of University Employees in Nigeria, a Historical Perspective". The study aimed to present historical events related to the independence of universities and academic freedom in Nigeria from 1990 to the present. The study used the analytical method by collecting previous studies on the subject in Nigeria. The results of the study showed that academic freedom from 1950 to 1970 was non-existent as students and teachers had to abide by the laws and policies enacted by the university.

However, there were several demonstrations against these laws where a group of teachers resigned, from 1979 to 1999; the universities faced many crises, including lack of infrastructure, violation of legal procedures and repression of academic freedom. Until academic freedom was formally recognized in the laws of universities, the study recommended the importance of achieving academic freedom and self-government through the development of ideas and the pursuit of goals and objectives that will achieve progress for the people and the nation.

Khataybeh and Al-Saud (2011) conducted a study entitled "Perceptions of faculty members in Jordanian universities to the degree of their academic freedom and its relationship with their research achievement" This study aims at identifying the perceptions of faculty members in Jordanian universities and their relationship with their scientific achievement. The study population consisted of all faculty members in Jordanian universities. The sample of the study consisted of 510 members selected by stratified random method. The study results showed that the perception of faculty members about their degree of academic freedom, as well as their research achievement came to a medium degree and there is no correlation between academic freedom and the academic achievement of faculty members.

Raafit (2010) conducted a study entitled "Degree of Academic Freedom at Yarmouk and Sultan Qaboos Universities". The study aimed at identifying the degree of academic freedom available to faculty members at Yarmouk and Sultan Qaboos universities as seen by the faculty themselves. To achieve the objective of the study, a questionnaire consisting of 44 items was prepared. The sample of the study consisted of 331 faculty members from both universities; it was selected randomly. The results of the study showed that the availability of academic freedom in the universities of Yarmouk and Sultan Qaboos was significant in the fields of teaching and scientific research, and medium in the areas of opinion and expression, and community service.

Sandman (2005) conducted a study entitled “Recent Issues in the Subject of Academic Freedom”. The aim of the study was to identify contemporary issues governing academic freedom in universities and colleges in the

Table 1. Description of the demographic variables of the study sample.

Variable	Category	Repetition	Percentage
Gender	Male	21	52.5
	Female	19	47.5
	Total	40	100
The scientific qualification	Bachelor	7	17.5
	Higher Diploma	4	10.0
	Master	7	17.5
	Ph.D.	22	55.0
	Total	40	100
Practical experience	<5	14	35.0
	5-10	8	20.0
	10-15	14	35.0
	>15	4	10.0
	Total	40	100
Academic rank	Professor	9	22.5
	Co-professor	8	20.0
	Assistant Professor	7	17.5
	Teacher	5	12.5
	Assistant teacher	11	27.5
	Total	**40**	**100**

American Region of Castrin. The sample of the study consisted of all the heads of universities and deans of colleges in the region mentioned (95). The results of the study pointed to the existence of contemporary and influential issues to be identified. These include: First: relations with co-workers, second: prevailing legislation and laws; third, freedom of expression; fourth: The full independence of the teaching staff and the researcher paid attention to the importance and necessity of separating and distinguishing between academic freedom inside the university and freedom of expression outside the walls of the university.

METHODOLOGY OF THE STUDY

The study used the descriptive analytical method. Questionnaire was used to collect the data of academic freedoms among faculty members specialize in special education in Jordanian universities.

Population of the study

The study population consists of all faculty members in Special Education in five Jordanian universities.

Sample of the study

A stratified random sample was taken to represent the sample population. 40 questionnaire items were distributed to faculty members in Special Education. All the questionnaires were retrieved, bringing the number of the sample to 40 faculty members. The following is a description of the study sample.

It is clear from Table 1 that the proportion of males from the study sample was 52.5%, while the proportion of females from the study sample was 47.5%. The percentage of their educational qualification (Bachelor or Bachelor) reached 17.5%, while the percentage of their educational qualification (higher diploma) reached 10.0%; the percentage of their educational qualification (MA) was 17.5%, and the proportion of their educational qualification (PhD) was 55.0%.

It is clear that the percentage of their experience (less than 5 years) reached 35.0%, while the proportion of their experience (5-10 years) reached 20.0%; the percentage of their experience (10-15 years) reached 35.0%, and the proportion of their experience (more than 15 years) reached 10.0%.

As shown in Table 1, the percentage of their scientific rank (professor) reached 22.5%, while percentage of their scientific rank (Associate Professor) reached 20.0%; the proportion of their scientific rank (Assistant Professor) reached 17.5%; the percentage of their scientific rank (teacher) reached 12.5%, and the proportion of their scientific rank (assistant teacher) reached 27.5%.

In examining the demographic characteristics of the study sample, it can be concluded that these results as a whole provide a reliable indicator of the eligibility of respondents to answer the questions in the questionnaire, and then rely on their answers mainly to derive the targeted results of the study.

Study tool

After the study problem, questions and hypotheses have been identified; the researcher prepared a questionnaire to measure the degree of academic freedoms among faculty members specialize in special education in Jordanian universities; the questionnaire was divided into two sections, namely:

Table 2. Reliability coefficient of internal consistency of questionnaire dimensions (Cronbach-Alpha).

No.	Dimension	Alpha (α) value
1	Freedom of expression	0.961**0**
2	Freedom of teaching	0.960**0**
3	Freedom to participate in academic decisions	0.944**0**
4	Freedom of scientific research	0.954
Total		0.985

Table 3. Averages and standard deviations for all areas of academic freedom among faculty members in special education in Jordanian Universities from their point of view.

Domain number	Field	SMA	Standard deviation	Degree of approval
1	Freedom of expression	3.18	0.96	Average
2	Freedom of teaching	3.15	0.90	Average
3	Freedom to participate in academic decisions	3.18	0.94	Average
4	Freedom of scientific research	3.20	0.86	Average
	Total degree	3.18	0.87	Average

Section I: Demographic variables, namely: gender, experience, scientific rank.
Section II: paragraphs of the questionnaire were divided into four areas:

The first area is freedom of expression, which includes (9) items.
The second area, which is freedom of teaching, includes (9) items.
The third area is the freedom to participate in academic decision-making, and includes (6) items.
The fourth area is the freedom of scientific research, and includes (9) items.

Validity and reliability of the study tool

The validity and reliability of the study tool were verified by ensuring:

1. Tool validity: The initial validity of the study instrument, namely the questionnaire, was verified by presenting it to a group of arbitrators and specialists in this field.
2. Tool reliability: In order to ensure that the questionnaire measures the factors to be measured, and verifying its validity, the researcher tested the internal consistency of the items of the scale; the coherence of the scale was evaluated by calculating the Cronbach Alpha coefficient. This is because the Cronbach-Alpha test is based on the consistency of the individual's performance from one item to another, and indicates the strength of correlation and consistency between the items of the scale in addition to reliability. Reliability coefficients as shown in Table 2 are indicated by the high privilege of the tool with a total stability of 0.985.This indicates the ability of the questionnaire to achieve the objectives of the study. It is clear from the table that the highest stability factor for the questionnaire dimensions was 961.Note that the minimum value of stability was 944.0. This indicates that the results of the questionnaire can be stable as a result of their application.

Study procedures

After confirming the validity and stability of the study tool and determining the required sample for the purposes of applying the study tool, the researcher distributed it to the study sample. Each of the statements for each item of the second part of the questionnaire is given scores to be treated statistically as follows: Very high (5) degrees, high (4) degree, medium (3) degree, weak (2) two degree, very weak (1) one degree.

RESULTS AND DISCUSSION

This chapter examines the questions that the study relied on through the questionnaire sections to reveal the degree of academic freedoms among faculty members in special education in Jordanian universities from their point of view. The answer to the first question: What is the reality of academic freedom among faculty members specialize in special education in Jordanian universities from their point of view? Table 3 shows the arithmetic averages and standard deviations of the responses of respondents to the reality of academic freedom among faculty members. In the special education in Jordanian universities from their point of view it is divided into their fields: The results showed that the field of freedom of expression obtained an Arithmetic mean of 3.18, and a standard deviation of 96; the field of freedom of teaching also got an average of 3.15, and a standard deviation of 90.The field of freedom to participate in academic decision-making obtained an average of 3.18, and a standard deviation of 0.94.The freedom of scientific research also obtained an arithmetic average of 3.20, and a standard deviation of 86.

Arithmetic averages for the fields of study

The field of freedom of expression

The arithmetic averages and standard deviations were

Table 4. Averages and standard deviations for all items relating to freedom of expression.

Item number	Item	SMA	Standard deviation	Rank	Degree of approval
9	I exercise freedom of expression regardless of my social status	3.35	1.12	1	High
8	The University encourages free thinking	3.25	1.17	2	High
4	I exercise freedom of expression regardless of my religious beliefs	3.23	1.07	3	Average
5	I can express my opinion freely in public meetings and events at the university	3.2	1.02	4	Average
3	The University encourages teachers to freely form their own convictions and opinions	3.18	0.98	5	Average
5	I can express my opinion in full freedom	3.13	1.09	6	Average
6	The University encourages the organization of free meetings and dialogues between teachers	3.12	1.26	7	Average
1	I exercise freedom of expression regardless of my specialty	3.10	1.03	8	Average
7	I can freely explain the scientific explanations related to my academic specialization	3.03	1.1	9	Average
	Total	3.18	0.96		Average

calculated for all items related to the field of freedom of expression as shown in Table 4. The table shows the averages and standard deviations, where the averages ranged between 0.353 and 3.03. The general arithmetic mean is 3.18, then came item (9), which provides that "I exercise freedom of expression regardless of my social status"; it ranked first with an arithmetic average of 3.35, and a standard deviation of 1.12. Item (7) states that: "I can freely offer scientific explanations concerning my academic specialization" in the last rank with an arithmetic average of 3.03, and a standard deviation of 1.1.

The field of freedom of teaching

Arithmetic averages and standard deviations were calculated for all items related to the field of freedom of teaching as shown in Table 5. The table shows the averages and standard deviations, where the averages ranged between 0.303 and 3.00 compared to the general arithmetic mean of (3.15).Item (18) states that "I have the freedom to choose the reference for the materials I teach" ranked first with an arithmetic average (3.30), and a standard deviation of 1.16; item(11) states that: "Commit to the implementation of the study plan during the semester"; it ranked last with an average of 3.00 and a standard deviation of 0.90.

The field of freedom to participate in academic decisions

The averages and standard deviations were calculated for all items related to the field of freedom of participation in academic decisions as shown in Table 6. The table shows averages and standard deviations, where the averages ranged between 0.333 and 3.00 compared to the overall average of 3.18.Item (21) states that "I have the freedom to participate in the discussion of topics related to the nature of my work within the department"; it ranked first with an arithmetic average 3.33, and a standard deviation of 1.12; item (20) states that: "I have the freedom to participate in scientific committees at the department level"; it ranked last with an arithmetic mean of 3.00 and a standard deviation of 1.09.

Freedom of scientific research

Arithmetic averages and standard deviations were calculated for all items related to the field of freedom of scientific research as shown in Table 7. The table shows averages and standard deviations, where the averages ranged between 0.303 and 3.10 compared with the general arithmetic average of 3.20. Item (33) states that "The University supports my participation in specialized scientific conferences"; it ranked first with an arithmetic average of 3.30, and a standard deviation of 1.02; item (29) states that: "I can do research and choose the subject I want to do without any influences from the university administration"; it ranked last with an arithmetic average of 3.10 and a standard deviation of 0.96.

Gender

To answer the second question: Are there any statistically significant differences at the level of significance ($\alpha \leq 5.00$) in the degree of practicing academic

Table 5. Averages and standard deviations for all items related to the field of teaching freedom.

Item number	Item	SMA	standard deviation	Rank	Degree of approval
18	I have the freedom to choose a reference for the subjects I teach.	3.3	1.16	1	Average
14	I have the freedom to choose the courses offered as appropriate for the academic specialization	3.28	1.01	2	Average
16	I have the freedom to choose topics related to the subject I teach	3.18	0.98	3	Average
15	I can talk freely with my students inside the lecture hall	3.15	0.98	4	Average
17	The university allows me the freedom to spread the truth in the way I see fit	3.14	1.05	5	Average
10	I can choose the method that I consider appropriate to convey the scientific content of the students without any restrictions	3.13	1.11	6	Average
12	The University provide appropriate teaching aids and techniques upon request	3.12	1.02	7	Average
13	I have the freedom to evaluate my students and give them the marks they deserve without external influences	3.03	1	8	Average
11	Commit to implementing the pre-planned study plan during the semester	3.00	0.99	9	Average
	Total	3.15	0.90		Average

Table 6. Averages and standard deviations for all items relating to freedom of participation in academic decisions.

Item number	Items	SMA	standard deviation	Rank	Degree of approval
21	I have the freedom to participate in the discussion of topics related to the nature of my work within the department	3.33	1.12	1	Average
22	I have the freedom to discuss and criticize the prevailing legislation in the university	3.28	1.01	2	Average
19	I have the freedom to participate in academic decisions regarding the nature of my work	3.18	1.11	3	Average
23	I have the freedom to discuss the topics raised in the department council or college council without any external influences	3.17	0.98	4	Average
24	I have the right to freely discuss the decisions of the university administration concerning me and my work.	3.15	1.08	5	Average
20	I have the freedom to participate in scientific committees at the department level	3	1.09	6	Average
	Total	3.18	0.94		Average

freedom among faculty members in special education in Jordanian universities from their perspective based on demographic variables (gender, experience, academic rank)? The value of T for the average degree of exercise of academic freedom was extracted among faculty members in the special education in Jordanian universities according to gender (male, female); the value of (T) was extracted for the average of the two categories, namely, male and female, and the results are as shown in Table 3. The results in Table 8 indicate that there is no statistically significant difference at the level of significance ($\alpha \leq 0.05$), between the arithmetic mean of the answers of the members of the two categories. They are male and female in the degree of exercise of academic freedom among faculty members from their point of view due to the gender variable. The significance level was

Table 7. Averages and standard deviations for all items relating to freedom of scientific research.

Item number	Items	SMA	standard deviation	Rank	Degree of approval
33	The university supports my participation in specialized scientific conferences	3.3	1.02	1	Average
28	Universities have books, journals, and modern scientific resources that support my research decisions	3.28	1.04	2	Average
30	In its legislation, the university provides fair standards for academic promotion	3.28	1.06	3	Average
32	The university allows faculty members to receive financial support from institutions other than the university	3.23	0.97	4	Average
27	I have the freedom to choose the scientific journals that I want to publish in it	3.2	0.85	5	Average
31	The university encourages joint work among faculty members in the field of scientific research	3.18	1.01	6	Average
25	I can communicate without restrictions to those who can support me financially, for the purposes of scientific research	3.15	1.1	7	Average
26	The university financially supports faculty members to carry out their research	3.13	1.02	8	Average
29	I can do research and choose the subject that I want to do without any influences from the university administration	3.1	0.96	9	Average
	Total	3.20	0.86		Average

Table 8. Arithmetic averages, standard deviations and value of (T) for male and female study sample responses.

Field	Group	SMA	Value (t)	Significance level
Freedom of expression	Males	3.10	-0.546	**0.588**
	Females	3.26		
Freedom of teaching	Males	3.16	0.084	**0.933**
	Females	3.13		
Freedom to participate in decision-making	Males	3.13	-0.334	**0.741**
	Females	3.24		
Freedom of scientific research	Males	3.21	0.067	**0.947**
	Females	3.19		
Total degree	Males	3.15	-0.203	**0.840**
	Females	**3.21**		

higher than 0.05, which is not statistically significant in special education in Jordanian universities.

Experience

Analysis of single variance (ANOVA) was used in the study of the degree of exercise of academic freedom among faculty members in Special Education in Jordanian universities from their point of view (Table 9). The table indicates that there are statistically significant differences at the level of significance (α≤ 0.05) in all fields, because the level of significance was less than (0.05), which is statistically significant.

To find the source of the differences, a Scheffe test was conducted for the post comparisons as shown in

Table 9. Analysis of the variance of the differences in the degree of exercise of academic freedom among faculty members in specialization special education in Jordanian universities from their point of view due to the variable of experience.

Field	Contrast source	Total squares	Degree of freedom	Average squares	Statistical (P)	Significance level
Freedom of expression	Between groups	17.064	3	5.688	10.958	0.000
	Within groups	18.686	36	-0.519		
	Total	35.750	39			
Freedom of teaching	Between groups	13.180	3	4.393	8.602	0.000
	Within groups	18.385	36	0.511		
	Total	31.565	39			
Freedom to participate in decision-making	Between groups	14.925	3	4.975	9.103	0.000
	Within groups	19.675	36	0.547		
	Total	34.600	39			
Freedom of scientific research	Between groups	14.032	3	4.677	11.374	0.000
	Within groups	14.805	36	0.411		
	Total	28.837	39			
Total degree	Between groups	14.415	3	4.805	11.672	0.000
	Within groups	14.821	36	0.412		
	Total	29.236	39			

Table 10. Dimensional comparisons in a "Scheffe" way the degree of practicing academic freedom among the faculty members in the special education specialization in the Jordanian universities from their point of view is attributed to the variable of experience.

Field	Categories (years)	SMA	<5 years	5-10 years	10-15 years	15 years
Freedom of expression	<5	2.41				
	5-10	2.96	0.54563			
	10-15	3.86	1.44444*	0.89881		
	>15	3.89	1.47619*	0.93056	0.03175	
Freedom of teaching	<5	2.58				
	5-10	2.72	0.14286			
	10-15	3.81	1.23016*	1.08730*		
	>15	3.67	1.08730	0.94444	0.14286	
Freedom to participate in decision-making	<5	2.46				
	5-10	3.00	0.53571			
	10-15	3.85	1.38095*	0.84524		
	>15	3.75	1.28571*	0.75000	0.09524	
Freedom of scientific research	<5	2.45				
	5-10	3.22	0.76984			
	10-15	3.72	1.26984*	0.50000		
	>15	**3.97**	**1.51984***	**0.75000**	**0.25000**	

* indicates existence of differences between the intersecting categories at the number.

Table 10. The table shows values that show variance and statistically significant categories. and to find out in favor of any class we look at the arithmetic mean, where the differences are favorable to the group with the highest

Table 11. Analysis of the variance of the differences in the degree of exercise of academic freedom among the faculty members in the specialization Special Education in the Jordanian universities from their point of view due to the variable of academic rank.

Field	Source of contrast	Total squares	Degree of freedom	Average squares	Statistical (P)	Significance level
Freedom of expression	Between groups	18.885	4	4.721	9.797	0.000
	Within groups	16.866	35	0.482		
	Total	35.750	39			
Freedom of teaching	Between groups	11.824	4	2.956	5.241	0.002
	Within groups	19.741	35	0.564		
	Total	31.565	39			
Freedom to participate in decision-making	Between groups	15.919	4	3.980	7.456	0.000
	Within groups	18.681	35	0.534		
	Total	34.600	39			
Freedom of scientific research	Between groups	14.668	4	3.667	9.058	0.000
	Within groups	14.169	35	0.405		
	Total	28.837	39			
Total degree	Between groups	15.031	4	3.758	9.259	0.000
	Within groups	14.205	35	0.406		
	Total	29.236	39			

average. It was in favor of a class (more than 15 years) in the fields of freedom of expression and freedom of scientific research. It was also for the benefit of the category (10-15 years) in the areas (freedom of teaching, freedom to participate in decision-making).

Academic rank

ANOVA was used in the study of the degree of the exercise of academic freedom among faculty members in Special Education in Jordanian universities from their point of view which is attributed to the academic Rank variable as shown in Table 11. The table indicates that there are statistically significant differences at the level of significance ($\alpha \leq 0.05$) in all fields, because the level of significance was less than (0.05), which is statistically significant. To find the source of the differences, Scheffe test was performed for the post comparisons as shown in Table 12. The table shows values that show variance and statistically significant categories. To find out in favor of any category we look at the arithmetic mean; the differences are in favor of the higher average group. It was in favor of a class (professor) in all areas of study.

Conclusion

The first question

The results of the analysis of arithmetic averages and standard deviations showed that the field of freedom of expression obtained an average of 3.18. And the field of freedom to participate in academic decision-making obtained an average of 3.18. The field of freedom of scientific research obtained an average of 3.20, and at an average level of importance. This indicates that the faculty members of the Jordanian universities carry out their responsibilities and functions in the educational processes, for continuous development. It is also attributed to the existence of a kind of independence in the administrative, financial and educational processes.

The field of freedom of expression

The results of the arithmetic averages for this field ranged from 0.353 to 3.03 to a medium degree; this indicates that the faculty members in the special education in Jordanian universities practice the freedom of expression and exchange ideas and discuss them openly.

The field of freedom of teaching

The results of the averages ranged from 30.3 to 3.00 and with a medium degree. It indicates that the faculty members in the special education in Jordanian universities have the freedom of thought and scientific and cognitive creativity without the presence of purposeful negative influences that develop the educational process.

Table 12. Comparative methods in the degree of exercise of academic freedom among faculty members in special education in Jordanian Universities from their point of view.

Field	Categories	SMA	Professor	Co-professor	Assistant professor	Teacher	Assistant teacher
Freedom of expression	Teacher	4.00					
	Co-professor	3.57	.43056				
	Assistant professor	3.51	.49206	.06151			
	Teacher	2.58	1.42222*	.99167	.93016		
	assistant teacher	2.27	1.72727*	1.29672*	1.23521*	.30505	
Freedom of teaching	Teacher	3.83					
	Co-professor	3.51	.31327				
	Assistant professor	3.30	.52557	.21230			
	Teacher	2.53	1.29383	.98056	.76825		
	Co-professor	2.51	1.32211*	1.00884	.79654	.02828	
Freedom to participate in decision-making	Teacher	4.02					
	Co-professor	3.50	.51852				
	Assistant professor	3.40	.61376	.09524			
	Teacher	2.57	1.45185*	.93333	.83810		
	assistant teacher	2.41	1.60943*	1.09091	.99567	.15758	
Freedom of scientific research	Professor	3.99					
	Co-professor	3.39	.59877				
	Assistant professor	3.52	.46384	.13492			
	Teacher	2.87	1.12099	.52222	.65714		
	Assistant teacher	**2.37**	**1.61392***	**1.01515***	**1.15007***	**0.49293**	

* indicates existence of differences between the intersecting categories at the number.

The field of freedom to participate in academic decisions

The results of the mean averages ranged between 0.333 and 3.00 and with a medium degree. It indicates that the faculty members in the special education in Jordanian universities apply academic freedom in an effective way to participate in academic and administrative decisions.

Freedom of scientific research

The results of the arithmetic averages ranged from 0.303 to 3.10 and with a medium degree. It indicates that the faculty members in the special education in Jordanian universities have sufficient freedom to change and develop curricula and choose appropriate teaching methods without any intervention for the purposes of scientific research and supporting the development process in universities.

The second main question

The absence of statistically significant differences in the degree of practicing academic freedom among faculty members was attributed to the gender variable. This can be attributed to the fact that faculty members are not affected by the degree to which Jordanian universities exercise academic freedoms by gender. The appearance of male members does not differ from females.

There is statistically significant difference in the degree of exercising academic freedom among faculty members due to variable experience. This result can be explained by the experience of faculty members in Jordanian universities; it does not affect the exercise of academic freedoms. Understanding and practicing academic freedom by university faculty enables them to use them regardless of experience.

The statistically significant differences in the degree of exercise of academic freedom among faculty members are attributed to the variable of academic rank. And this can be explained by the fact that the academic rank of faculty members in Jordanian universities affects the degree of their exercise of academic freedom.

Recommendations

Based on the findings of the study, the researcher recommends the following:

1. The need to separate and distinguish between academic freedom and freedom of expression within the university.
2. The need to achieve academic freedom through the development of ideas and the pursuit of goals that will achieve progress in all areas of life.
3. The need to improve the concept of academic freedom among faculty members and open the competition market by defining the basic objective of academic freedom.
4. The need to emphasize the academic freedom of the teaching staff in order to increase the development of universities, which is reflected on the communities positively.
5. The need to give faculty members freedom in universities to get students to the maximum degree of development of their abilities and increase their knowledge.
6. Application of this study to other areas of specializations other than special education.
7. Application of this study to other universities other than the universities of the center.
8. The application of this study to other universities other than the central universities in the Kingdom.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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The effectiveness of an instructional design training program to enhance teachers' perceived skills in solving educational problems

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This study aims to identify the effectiveness of a training program on the ADDIE instructional design model to enhance teachers' perceived skills in solving educational problems. The ADDIE training program is proposed to help teachers identify their educational problems and find systematic solutions to them. To evaluate the effectiveness of the proposed training program, action research with the quasi-experimental design was employed. Four groups, in total 77 in-service teachers, undertook a short-term training program on the ADDIE model. Data were collected through a pre and post self-assessment questionnaire that consisted of five sections regarding the primary ADDIE skills (analysis, design, development, implementation, and evaluation), and open-ended questionnaires to understand teachers' expectations and attitudes toward this training program. The findings indicate that the post-self-assessment questionnaire scores were significantly higher than the pre self-assessment questionnaire scores. This study revealed that the ADDIE training program was highly effective in terms of improving teachers' ability to solve educational problems from teachers' perspectives. However, teachers indicated that they need more and longer-term training programs on these skills as well as longitudinal studies measuring these skills. Teachers suggested that this program be made a compulsory program for every pre and in-service teacher.

Key words: Instructional design, ADDIE model, problem-solving skills, teacher professional development.

INTRODUCTION

Being a 21st-century educator is not an easy task. Recent social, economic and political developments have had a significant impact on education, in general, as well as on the roles teachers play in the classroom. These changing roles, rising demands, and standards from society and policymakers necessitate the employment of high-quality teachers (Gajdos, 2016). Researchers and educators agree that the quality of teachers has a significant impact on learning and achievement of students. Harder (2005) claimed that effective teachers must have both content knowledge, skills and an effective teaching methodology.

Despite the general acceptance of professional development as necessary for improving teachers' skills

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and education, analysis of professional development research has consistently highlighted the inefficiency of most programs (Bayar, 2014). There is no question that a variety of factors contribute to this inefficiency. Nonetheless, Guskey (2002) proposed that most interventions fail because they do not take two important factors into consideration: (1) what motivates teachers to participate in professional development, and (2) the mechanism by which teachers usually improve. Bayar (2014) argued that any successful professional development program should meet the needs of teachers and schools, ensure the involvement of teachers in the preparation of professional development events, provide incentives for active participation, and ensure long-term commitment and high-quality trainers.

Research efforts that focus on pre and in-service teachers argue that being a professional teacher means special integration of high-level knowledge of content with general problem-solving skills (Guskey, 2002; Bayar, 2014; Wati, 2011; Ma et al., 2018). A teachers' professional life is not without daily problems and difficulties, whether it is in the content they teach, curriculum design, or managing different needs of students. Therefore, training teachers in the skills necessary to deal with these problems becomes an essential part of professional development. According to Gajdos (2016), one of the fundamental skills teachers need to learn is efficient problem-solving. Problem solving skills are strongly linked to general cognitive and metacognitive processes such as problem interpretation and representation, reasoning, information gathering, assessment, solutions development, decision-making, preparation, reflection and evaluation (Gajdos, 2016).

An iterative process model from Instructional Design (ID), such as ADDIE, can function as a cognitive organizational framework for teachers' development. Harder (2005) argued that the principles of ID provide a framework for teachers' planning, and for strategic management of their teaching tasks and problems, which can effectively enhance their career. Additionally, he states that ID is a good teacher development tool because it is applicable across domains and disciplines.ID can provide a framework and models for teachers continuing training and professional development.

The aim of the current study was therefore to investigate the effectiveness of the ADDIE instructional design model training program in improving the skills of teachers in solving educational problems, and to determine teachers' expectations and attitudes toward this training program.

LITERATURE REVIEW

In almost any modern initiative to improve education, high-quality professional development is a central component. Educational leaders are becoming increasingly aware that the quality of their schools cannot be better than the teachers and administrators who work within them. While the content and structure of these proposed professional development programs vary widely, many share a common purpose, which is to modify professional behaviours, values, and perception of school staff and administrators toward an articulated aim. Guskey (2002) defined professional development programs as "systematic efforts to bring about change in the classroom practices of teachers, in their attitudes and beliefs, and in the learning outcomes of students" (p.381).

What attracts teachers to professional development is their expectation that it will expand their knowledge and skills, contribute to their growth, and improve students' performance. However, teachers tend to be quite realistic as well, what they hope to gain through professional development are specific, concrete, and practical ideas directly related to their classroom's day-to-day operation (Guskey, 2002). Opfer and Pedder (2011) argued that teachers' professional development should help teachers build upon their knowledge, improve their performance in the classroom and resolve challenges.

In-service teachers are used to taking different types of professional development programs. These programs can be short-term for few days or long-term and can extend for several weeks or months. Another type of professional development program is mentoring programs for novice teachers, where they can learn from interacting with experts; however, the mentoring process requires time and a degree of interaction not typical in novice teachers' experience (Bayrakci, 2009). All these activities vary widely in their ability to enhance teachers' learning and development. Some are administered piecemeal rather than comprehensively or systematically, thereby affecting effectiveness and applicability (Harder, 2005).

In addition, teachers have varying needs, circumstances, and the need for teaching development; teachers who know the substance of teaching or pedagogy may not be able to apply it to their teaching practice. Ma et al. (2018) argued that pedagogical knowledge and comprehension are prerequisites, but they do not guarantee that teachers can teach well. It also does not mean they know which concepts are difficult for students, what representations are best for certain ideas, or how best to develop conceptual understanding (Ma et al., 2018). Any professional development intervention must be transparent, reliable, accurate, and appropriate to the needs of teachers for effective teaching; and it must comply with the essence of the teaching role and the teaching skill requirements (Harder, 2005).

In order to be able to respond to a variety of challenges facing them, teachers need a wide range of skills. That is why several experts argue that a key component of professional development is problem-solving (including decision-making) (Gajdos, 2016). Teaching is a dynamic

problem-solving task in terms of its cognitive and procedural criteria (Smith and Ragan, 1999). It involves flexibly adapting to a diverse set of circumstances, and the application of a specific body of knowledge. Effective teachers adapt to the needs of learners and respond to information about the progress of learning and the accomplishment of tasks. To satisfy these demands, teachers need an effective cognitive structure to regularly change teaching that allows new contingencies to be easily added to their existing mental representations (Dick et al., 2001).

Gajdos (2016) stated that teachers know that the ability to solve problems is dependent on the creation of cognitive organizational structures that direct what teachers think and how they pose problems. Cognitive organization of values and knowledge is an important strategy for building trust and skills. According to Gajdos (2016), “Problem solving skill is strongly connected to such general cognitive and metacognitive processes as perception and representation of the problem, reasoning, gathering information, analyzing, creating solutions, decision making, planning, reflecting and evaluating”(p.4).

Teachers not only need to solve problem skills during the immersive instruction process in the classroom, but also when reviewing the prior lesson and preparing for the next. In this regard, the whole pedagogical cycle, beginning with preparation and ending with self-evaluation, is seen as evaluating, behaving, thinking, determining and solving problems. Gajdos (2016) argued that teaching is increasingly seen as a technical practice involving careful analysis of each scenario, choice of goals, creation, and evaluation of suitable learning opportunities, assessment of their effect on the success of students, attention to learning needs of students and personal or collaborative reflection on the entire process.

In conclusion, the effectiveness of the pedagogical problem-solving process depends on personal and technical factors such as: 1- The combination of different pieces of knowledge, such as professional theoretical knowledge, practical knowledge, knowledge of (the) self, knowledge of the problem-solving process, and knowledge of the current situation. 2- The combination of different skills, for example: general thinking skills, professional skills, and problem-solving skills, 3- motivational factors like emotions, beliefs, and attitudes (Ma et al., 2018).

Harder (2005) argued that problem-solving skills can be the connection between knowledge and procedural knowledge; therefore, a clear opportunity in instructional design (ID) is appropriate for professional development events and can respond to the needs of teachers. Dabbagh et al. (2000) claimed that ID is a structured problem-solving process defined by the problem context, the instructional designer's knowledge and skills, and the quality of resources available. As stated by Harder (2005), ID is a process that can direct the planning and management of education. The concepts are based on learning theory and extend through age, contexts, level of skill and domains of content (Reigeluth, 1999). ID is a systematic distillation of best practices in teaching planning, including an emphasis on strategically choosing learning events that further the achievement of learning goals. ID supports learning as it involves structured, logically grounded educational activities and approaches that facilitate learning, engagement and success (Smith and Ragan, 1999).

ID's primary objective is to use systematic design procedures to design efficient and effective solutions for educational problems (Gustafson and Branch, 2002). A systematic approach requires coordination of all educational activities, because even good teachers can create major differences between targets, strategies and assessments without such a systematic approach (Gustafson and Branch, 2002). Although several ID models and methods have been developed, they all include, in one form or another, the core elements of research, design, development, implementation and evaluation (ADDIE) to ensure consistency between the objectives, strategies, evaluation and effectiveness of the resulting instruction. As stated by Smith and Ragan (1999), these five faces or skills consist of:

Analysis

The analysis phase is the cornerstone of all phases of educational design. During this phase, the instructional designer defines the problem, the gap in the reality (needs), the causes and possible solutions to it. This phase consists of a needs analysis, audience analysis, context analysis, and task analysis; all this information will help to set the possible solution and goals.

Design

It is the process of translating the analysis information into clear, actionable steps, by setting initial plans to the educational product. This phase is the production of the road map that the designer will use to develop the solution. The design also includes the methods and procedures related to how the solution will be implemented. In this phase, the instructional designer should design: the educational aims, the sequence of learning, the educational strategies, the instructional technology and the assessment tools.

Development

This is the phase of transforming the design into a real product. In this phase, the instructional designer transforms the solution components to physical products

that are available for practical use. It goes through several stages: manufacturing of prototypes, piloting of prototypes and final product iterations.

Implementation

At this phase, the product is used in a real environment, in other words, implementing the solution in the educational environment and on an audience. The implementation process may be done experimentally first to a group of experts in that specialty or a small group of participants, before implementing it extensively in the community. The implementation phase also consists of some important procedures, such as collecting formative and final evaluation data, and monitoring the effectiveness of the product, providing technical support, and managing and publishing the product (solution).

Evaluation

At this phase, the data collected in the implementation phase are used to judge the efficiency and effectiveness of the design, before using the data to develop and improve the product. In this phase, the instructional designer focuses on evaluating the efficiency of the solution and the design plan itself, and suggests a development plan if necessary. ADDIE's principles are based on learning theory and they are applicable across age, settings, skills and content domains (Druckmanand Bjork, 1994; Reigeluth, 1999). According to Dabbagh and Blijd (2010), this systematic design models a distinct instructional or pedagogical method involving the investigation and exploration of content, theory, and process related to the project at hand. Introducing users to the literature of the ID models, principles and processes take place within the context of solving a real-world performance problem and developing functional prototype solutions. Using ID models, such as ADDIE, allows teachers to perform different roles to evaluate challenges, find potential approaches and directions, and strives to jointly develop a professional product that meets the needs described. Teachers deal with many of the characteristics that represent complex problem solving such as a high level of ambiguity and navigating among multiple solution and solution paths (Dabbagh and Blijd, 2010).

While there is a body of theoretical and empirical literature on ADDIE as an instructional design model (Rahman et al., 2014; Ahmadigol, 2015; Abidin and Tho, 2018), it addresses aspects of using ADDIE's model to design educational products such as courses and software, with less focus on the role of this model in teacher professional development. The present study adds to this literature in that it utilizes the ADDIE model to develop teachers' professional skills, particularly with regard to solving educational problems. This study argues that coaching teachers on ADDIE skills provides them with systemic knowledge and the awareness to help find systemic solutions for educational problems.

Research questions

Can ADDIE training programs enhance teachers' problem solving skills?

What are teachers' expectations of the ADDIE training program?

What are teachers' attitudes toward the ADDIE training program?

ADDIE training program

Although there are many models of ID, the ADDIE model has been chosen because it is standardized and common for almost all models of ID and has been widely used for learning design. The ADDIE model helps instructional designers and teachers create an efficient and effective instructional template by adapting the ADDIE model processes to any educational product (Druckman and Bjork, 1994). In this study, teachers are coached on applying ADDIE phases and skills on educational problems of their choice in order to find solutions for them. The phases of the ADDIE model and their skills are shown in Figure 1.

Analysis

In this phase, teachers were asked to define their problem and analyse all the surrounding factors that can assist in understanding the situation, the causes, and suggest methods of treatment as well. After the teachers discussed these with their groups, they chose the best solution to design. In this phase, the teachers were coached on these sub-skills of analysis:

1. Analyze the needs (or problems) associated with the educational content.
2. Identify appropriate solutions to solve the educational problem presented (setting the main goal).
3. Sort the educational content into its main components (concepts, facts, generalizations, skills and values).
4. Analyze students' psychological and social characteristics, and the individual differences affecting the learning process.
5. Analyze the students' background related to educational content.
6. Analyze the educational environment and its various components (facilities, equipment, time, and materials),

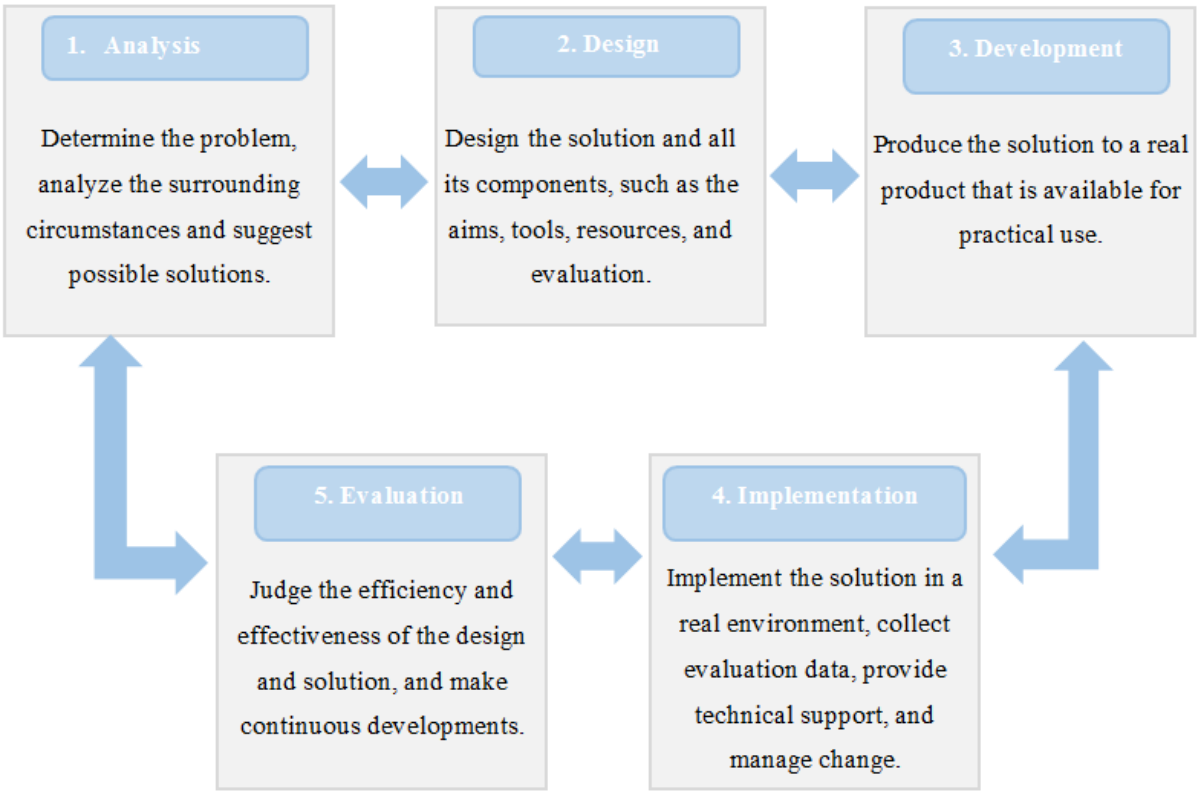

Figure 1. The Skills of the ADDIE's phases.

and compare them with the requirements necessary to teach the content.
7. Identify various educational sources (or references) of the required knowledge.

Design

At this phase, the solution is designed and the detailed specifications of the solution are defined on the storyboard. The teachers, with their groups, were asked to draw their plan's storyboard with all the needed details:

1. Design a clear and detailed educational plan for implementation.
2. Formulate realistic, verifiable behavioural goals for the content in light of the potentials available in the environment.
3. Formulate diversified behavioural goals in the three areas: cognitive, emotional, and skills as required by the content.
4. Use the principles of teaching and learning theories in the design process.
5. Rearrange and organize educational content according to the sequence that is appropriate for achieving the educational goals.
6. Design appropriate learning strategies to achieve content goals.
7. Design educational activities that promote real learning and demonstrate how it relates to reality.
8. Choose the appropriate instructional technologies to achieve the goals of the content.
9. Design a variety of different assessment methods (oral, written, and practical tests) commensurate with the content and its objectives.
10. Build a clear and detailed rubric that clarifies the assessment criteria.

Development

In this phase, teachers were asked to use the necessary tools, such as computers and their applications, to develop the design model (storyboard). For example, teachers produced the materials and tools needed for the design of their solution. The teachers were also able to go back to the design phase and modify the design after their observations in the development stage. In this phase, the teachers were coached to:

1. Develop and update various educational resources (or references).
2. Produce appropriate instructional technologies to deliver educational content, such as a paper game or

learning software.
3. Understand the design and production quality criteria for instructional technologies.
4. Provide clear and complete instructions about educational content, accompanying activities and requirements (assignments).

Implementation

In this phase, the teachers were supposed to implement the solution in the real world and collect the evaluation data; however, due to the short time of this training program, and the lack of time of real implementation, the teachers were asked to write detailed implementation plan, in terms of the process, procedure, and timeline. They were also asked to write the expected challenges and suggest supporting plan. The teachers were coached to:

1. Commit to the teaching plan that had been designed.
Encourage students' participation.
2. Commit to using the strategies and technologies identified in the plan.
3. Listen to participants' inquires, and provide them with continuous and appropriate feedback.
4. Convince others using the design intervention, and encourage them to adopt it.

Evaluation

In this study, teachers were asked to identify weakness in the design and any challenges, and suggest a development plan. In this phase, the teachers were coached on these skills:

1. Distinguish the difference between the concepts of the assessment and evaluation.
2. Commit to pre, structural and post evaluation.
3. Analyze and document the evaluation findings for use in developing the design's plan.
4. Provide appropriate feedback to participants based on the evaluation results.
5. Suggest appropriate treatment plans for the participants.
6. Encourage participants to use self-evaluation.
Evaluate the content and strategies at different stages of the lesson and curriculum.
7. Develop the teaching performance using participants and colleagues' feedback.

METHODOLOGY

This study conducted an action research based on the ADDIE training program using a quasi-experimental one-group design with in-service teachers. The data were collected during the summer in Saudi Arabia in the summer of 2019. This study was conducted over 4 weeks, which is a training program that started every week. The following sections explain the selection of participants, the study procedure and the methods of data collection.

Participants

The participants of this study consisted of 77 female in-service teachers from different schools in different cities in Saudi Arabia. They were teachers teaching various disciplines, including math, science, special education, and English language studies. Participant teachers taught different grades ranging from kindergarten to secondary school. Four training programs were held on different dates, and the teachers registered themselves in one of these programs based on their preferred date and time. This resulted in four random groups made up of 18, 23, 19 and 17 teachers, respectively. Each group participated in the same training program, and the study instruments were applied in all groups. Before the training program began, the trainer (researcher) explained the procedures to the participants and obtained their consent. Participants were informed that their name would be replaced by numbers during the analysis of their data.

Study procedures

Each group was coached on ADDIE skills for one week (20 h), and the same procedures were applied to each group. In each training group, the teachers were divided into sub-groups based on their disciplines. Teachers were asked to discuss and choose an educational problem or challenge they faced. They were then informed that during the training program, they would look for a suitable solution.

The training program consisted of two parts, a theoretical part, where the trainer introduces and explains the main concepts regarding each phase of ADDIE and its skills. The second part consisted of practical training. Teachers chose different problems, such as problems related to the content, curriculum, students' motivation toward a certain subject, or lack of instructional technologies or assessment methods. They were then given time to practice what they learned and apply ADDIE to their problems. After each phase of ADDIE, each group was asked to present their work to the other groups, then gather trainer and peer feedback on their work. At the end of the final day, the teachers presented their solution designs to the other groups. With regard to the research instruments, teachers were asked on the first day of training, to complete the pre-self-assessment questionnaire, and answer an open-ended questionnaire about their expectations of the training program. On the last day of the training, the post-self-assessment questionnaire was completed by the teachers to evaluate the differences in the teachers' problem-solving skills. Teachers were also asked to answer an open-ended questionnaire about their attitudes toward the training program.

Data collection

To answer the study questions, data were collected using quantitative and qualitative tools: a pre and post self-assessment questionnaire, and open-ended questionnaires.

Pre and post self-assessment questionnaire

The self-assessment questionnaire included two main parts: the first part consisted of basic information about the teachers, such as their discipline, number of years teaching, grade they teach, and whether they have attended similar programs before. The second part included 34 statements related to teaching and learning skills, and was categorized under ADDIE's five main phases. The

Table 1. The reliability statistics.

	No. of Items	Cronbach's Alpha
Pre	34	0.929
Post	34	0.911

teachers had to address these statements and indicate their level of skill on a three-point Likert scale: 'excellent=3', 'average=2' and 'weak=1'. All the teachers had at least two years' experience teaching, so they were expected to have basic knowledge of ADDIE skills and use part of these skills during their educational career, even if they did not know these skills were part of ADDIE. The questionnaire was given to the teachers before and after the training program.

The validity of the questionnaire was tested statistically; Pearson's coefficients were conducted (the correlation of each statement with the total axis to which it belongs), and it was highly and strongly correlated. Moreover, the questionnaire was presented to some professors in the College of Education at King Saud University, and their comments were used to improve questionnaire statements and ensure its clarity and validity as well. The clarity and reliability was tested statistically; Cronbach's alpha was completed for pre and post questionnaires to ensure internal consistency (Table 1). The value of Cronbach's alpha for the 34 statements was a = (0.929) and (0.911) for the pre and post assessment questionnaire, respectively, indicating that the questionnaire was internally consistent and reliable.

Open-ended questionnaire

Two open-ended questionnaires were used. The first one was asked at the beginning of the training program and was used to determine teachers' expectations about the program. It consisted of two open questions about the participants' aims and expectations. The second questionnaire was used at the end of the training program to determine teachers' attitudes toward the program. It consisted of three open-ended questions that helped assess the participants' attitudes. The questionnaires were presented to some professors in the College of Education at King Saud University, to check the clarity and validity of the questions.

RESULTS AND DISCUSSION

The main purpose of this study is to investigate the role of the ADDIE model to enhance teachers' perceived skills in solving educational problems. Additionally, the study sought to identify teachers' expectations and attitudes toward the ADDIE training program. This section discusses answers to each of the research questions based on the study's findings.

Analyzing the demographic data may help in a deeper understanding of the participant's responses, and provide more information about the applicability of the ADDIE program on teachers with a wide range of teaching experience in different disciplines. The results illustrate the ability to generalize teaching and coaching ADDIE skills for different teachers and explain how they benefit from it. Table 2 presents the demographic data of the participants.The data show that 43.4% of the participants have 7 to 12 years of teaching experience, and about 30% have experience in teaching for more than 13 years. Only 26.3% were new teachers who had 2 to 6 years teaching experience. Most of the participants, 83.1%, have a bachelor's degree, and 16.9% have a master's degree. The participant's specializations were varied, with Arabic language, 9.1 and 15.9% Computer science, 14.3% Islamic studies, 11.7% Math and Science, English language and Special education, and 6.5% Social studies, Arts and Kindergarten. With regard to grades, 7.8% teach kindergarten, 32.5% primary, 26% intermediate, and 33.8% secondary. Although nearly 75% of the participants had more than seven years of teaching experience, only five teachers out of 77 had attended a training program in ID before.

First research question: Can ADDIE training programs enhance teachers' problem solving skills?

The first research question concerned the impact of the training program in enhancing teachers' perceived problem solving skills. This was assessed by using the means and standard deviation of the skills and paired-samples t-test to compare the mean of the pre and post self-assessment questionnaire scores. The results are presented in Tables 3 and 4.

Table 3 presents (Table 3) represents the teachers' performance in each skill of ADDIE before and after the training program. The results show that teacher performances in the post questionnaire were better than in the pre-questionnaire. Moreover, the data identified which skills teachers were weakest in before the training program, such as sorting the educational content into its main components, using the principles of teaching and learning theories, building assessment rubrics, developing educational resources, understanding the design and production quality criteria for instructional technologies, convincing others of the benefit of their design interventions and documenting the evaluation findings for development purposes.

Table 4 shows that the sig. is 0 and less than 0.05 for all ADDIE skills, which indicates that there is a significant difference between the pre and post scores toward the post-self-assessment questionnaire. Participants in the training program had improved scores in all areas of ADDIE skills: t(76)= -10.99, p=0.00, in analysis skills, t(76)= -9.92, p=0.00, in design skills, t(76)= -12.65, p=0.00, in development skills, t(76)= -8.15, p=0.00, in

Table 2. The Demographic Data.

Demographic data	Percentage	Frequency	Percentage
Teachers' qualifications	Bachelor's Degree	64	83.1
	Master's Degree	13	16.9
Total	Total	77	100
Teachers' discipline	Arabic Language	9	11.7
	Art	5	6.5
	Computer Science	12	15.6
	English Language	7	9.1
	Islamic Studies	11	14.3
	Kindergarten	5	6.5
	Mathematics	9	11.7
	Science	7	9.1
	Social studies	5	6.5
	Special Education	7	9.1
Total	Total	77	100
Teaching experience (years)	2 to 6	20	26.3
	7 to 12	33	43.4
	13 to 17	11	14.5
	>17	12	15.8
Total	Total	77	100
Grade taught	Kindergarten	6	7.8
	Primary	25	32.5
	Intermediate	20	26.0
	Secondary	26	33.8
Total	Total	77	100
Attended ID training program before	Yes	5	6.5
	No	72	93.5
Total	Bachelor's Degree	77	100

implementation skills, and t(76)= -10.68, p=0.00, in evaluation skills. Consequently, the participant total score in pre and post self-assessment improved t (76)= -12.86, p=0.00.

The above results show that the training program was able to contribute to improving teachers' problems solving skills from teachers' perceptions. Moreover, the data show that although 75% of the participants have more than seven years teaching experience, they still need support in main teaching and learning skills including ADDIE. In addition, the data show that the least difference between the pre and post-questionnaire was in the implementation skills. This may be due to the fact teachers usually focus on developing their performance in the classroom and in practical teaching skills, rather than improving their planning, developing and evaluation skills. This finding is consistent with Harder (2003)'s results, which showed that teachers focus on some ADDIE elements, especially the implementation process, but do not focus on all of the ADDIE elements.

Second research question: What are teachers' expectations of the ADDIE training program?

The second research question aimed at identifying teachers' expectations toward the ADDIE training program. To answer this question, the data were collected from the open-ended questionnaire that was distributed to the teachers at the beginning of the training program on the first day. A coding approach based on thematic analysis principles was applied to analyse the qualitative data collected from the open-ended questionnaires. The data were collected, reviewed, and organized under two main themes: aims of attending the training program and expectations of its benefits. The

Table 3. Means and Standard Deviations for ADDIE Skill (n=77).

	Skills	Pre		Post	
		Mean	Std. deviation	Mean	Std. Deviation
1	Analyze the needs (or problems) associated with the educational content.	2.42	0.522	2.95	0.223
2	Identify appropriate solutions to solve the educational problem presented (setting the main goal).	2.40	0.494	2.92	0.270
3	Sort the educational content into its main components (concepts, facts, generalizations, skills and values).	2.32	0.595	2.81	0.399
4	Analyze students' psychological and social characteristics, and the individual differences affecting the learning process.	2.65	0.580	2.99	0.114
5	Analyze students' background related to educational content.	2.55	0.551	2.99	0.114
6	Analyze the educational environment and its various facilities, and compare them to the requirements that should exist to teach the content.	2.62	0.563	2.96	0.195
7	Identify various educational sources (or references) of the required knowledge	2.57	0.594	2.92	0.270
	Analysis skills	2.50	0.339	2.93	0.140
8	Design a clear and detailed educational plan for implementation.	2.36	0.647	2.90	0.307
9	Formulate realistic, verifiable behavioural goals for the content in light of the potentials available in the environment.	2.70	0.488	2.94	0.248
10	Formulate diversified behavioural goals in the three areas: cognitive, emotional, and skills as required by the content.	2.71	0.535	2.95	0.223
11	Use the principles of teaching and learning theories in the design process.	2.08	0.644	2.84	0.365
12	Rearrange and organize educational content according to the sequence that is appropriate for achieving the educational goals.	2.62	0.539	2.91	0.332
13	Design appropriate learning strategies to achieve content goals.	2.60	0.544	2.94	0.248
14	Design educational activities that promote real learning and demonstrate how it relates to reality.	2.53	0.598	2.91	0.289
15	Choose the appropriate instructional technologies to achieve the goals of the content.	2.77	0.456	2.97	0.160
16	Design a variety of different assessment methods (oral, written, and practical tests) commensurate with the content and its objectives.	2.61	0.542	2.94	0.248
17	Build a clear and detailed rubric that clarifies the assessment criteria.	2.03	0.688	2.75	0.491
	Design Skills	2.50	0.356	2.90	0.177
18	Develop and update various educational resources (or references).	2.12	0.648	2.86	0.352
19	Produce appropriate instructional technologies to deliver educational content, such as a paper game or learning software.	2.38	0.608	2.90	0.347
20	Understand the design and production quality criteria for instructional technologies.	2.06	0.592	2.88	0.362
21	Provide clear and complete instructions about educational content, accompanying activities and requirements (assignments).	2.51	0.620	2.92	0.315
	Development skills	2.27	0.461	2.89	0.242
22	Commit to the teaching plan that has been designed.	2.78	0.417	2.95	0.223
23	Encourage students' participation.	2.83	0.441	2.96	0.195
24	Commit to using the strategies and technologies identified in the plan.	2.55	0.597	2.95	0.223
25	Listen to students' inquires, and provides them with continuous and appropriate feedback.	2.86	0.420	2.97	0.160
26	Convince others using the design interventions and encourage them to adopt it.	2.22	0.681	2.88	0.323
	Implementation skill	2.65	0.328	2.94	0.129
27	Distinguish the difference between the concepts of the assessment and evaluation.	2.49	0.599	2.97	0.160
28	Commit to pre, structural and post evaluation.	2.39	0.691	2.92	0.270
29	Analyze and document the evaluation findings for use in developing the design's plan.	2.19	0.670	2.88	0.323

Table 3. Conrtd.

30	Provide appropriate feedback to students based on the evaluation results.	2.66	0.528	2.96	0.195
31	Suggest appropriate treatment plans for the students.	2.57	0.572	2.97	0.160
32	Encourage students to use self-evaluation.	2.43	0.677	2.92	0.270
33	Evaluate the content and strategies in different stages of the lesson and curriculum.	2.31	0.613	2.95	0.223
34	Develop the teaching performance using students and colleagues' feedback.	2.64	0.560	2.95	0.223
	Evaluation skills	2.46	0.407	2.94	0.129

Table 4. Results of paired-samples T-Test for pre- and post-self-assessment questionnaire scores.

		Mean	N	Std. deviation	Mean differences	t	df	sig.
Pair 1	Analysis skills pre	2.50	77	0.33868	-0.429	-10.991	76	0.000
	Analysis skills post	2.93	77	0.14017				
Pair 2	Design skills	2.50	77	0.35559	-0.403	-9.920	76	0.000
	Design skills post	2.90	77	0.17655				
Pair 3	Development skills pre	2.27	77	0.46122	-0.623	-12.654	76	0.000
	Development skill post	2.89	77	0.24161				
Pair 4	Implementation skills pre	2.65	77	0.32750	-0.296	-8.148	76	0.000
	Implementation skills post	2.94	77	0.12920				
Pair 5	Evaluation skills pre	2.46	77	0.40670	-0.481	-10.680	76	0.000
	Evaluation skills post	2.94	77	0.12918				
Pair 6	All pre	2.48	77	0.31854	-0.446	-12.856	76	0.000
	All post	2.92	77	0.14208				

data showed that teachers attended the training program for different reasons, for example, many teachers indicated that they attended this program because it is a new topic and they wanted to learn about it. Data collected from the self-assessment questionnaire indicated this information as well, where only five teachers out of 77 had attended a similar program. This confirms that although ADDIE skills are important, teachers lack knowledge about these skills and their application:

"I attended this program because I want to know what instructional design is, its models, and how to apply them in the real world."
"Instructional design is a new concept for me, and I want to know more about it."

Moreover, some other teachers said that they attended this program for self-improvement and professional development. They wanted to learn how to teach in effective ways, organize their work, succeed in achieving their educational aims, and enhance their work motivation:

"I want to develop myself and my professional work by learning new information."
"I want to learn new ways of teaching."
"I want to learn something that might help increase my motivation toward my work."

It seems that teachers, in general, are concerned about their professional development, and are looking for new ways to facilitate their teaching performance. At the same time, teachers have an ambiguous image of instructional design skills and the ADDIE model, and there is a real need to have this program and learn new applications for these skills.
With regard to teachers' expectations toward the ADDIE

training program, most of the teachers expected to learn something related to design and use typical technical tools, such as computer software or applications. They were surprised when they were informed that the program does not directly use or include any computer software. Some of the teachers' expectations are included:

"I will learn how to design visual infographics."
"How to use technology in the classroom in efficient ways."
"Learn how to design learning software."
"Enhance students' skills in using technology in their learning."
"I want to learn new information in E-learning."

There is a general misunderstanding of ID that links ID and its models to the field of computer science. Participants tend to consider ID models as being used to design computer software, and fail to consider the cognitive skills that these models can enhance. Harder (2005) stressed the goal of using ID with the aim of producing new software or instructional technologies, as well as using systematic design to make instruction more effective and efficient.
Some of the other expectations teachers had were more general; they expected to learn how to design and plan their teaching material, such as lessons, courses, assessment methods, and teaching strategies:

"I want to learn how to plan for my lesson in the right way."
"I want to learn how to improve the learning outcomes."
"I want to know how to teach in efficient ways and learn new strategies."
In terms of this research goal, a few teachers expected to learn something related to problem-solving skills:
"I will learn how to find weaknesses in the classroom and resolve them."
"It will help me make adjustments to some problems that I face in my career."
"It will help me to find solutions to some classroom and students problems."

Although this research focuses on applying ADDIE skills to solve educational problems, practice in these skills can indirectly help in responding to all of the teachers' expectations. As stated by Harder (2003), ID may serve as a cognitive organizational structure for teaching competence development, and may help teachers make connections between new and existing teaching and learning skills.

Third research question: What are teachers' attitudes toward the ADDIE training program?

The third research question aimed to identify teachers' attitudes toward the ADDIE training program. Data were collected from the open-ended questionnaire, which was distributed to teachers at the end of the training program. A thematic analysis was conducted on the data, and the data showed that most of the teachers thought the training program was interesting, useful and important. The teachers indicated that they learned things they did not know before. Additionally, some teachers claimed that the program responded to their needs and exceeded their expectations. The following is some of their feedback:

"One of the most useful programs I have attended; I benefited personally and professionally."
"I appreciate that I registered for and attended this training program; it was the best thing I did this summer."
"I think the instructional design and its models are very important and useful if they are applied in the right way."
"It is a very important program. It responds to our educational reality issues and can help to solve their weaknesses."
"I learned a lot of new things; I have never attended such a program."
"This program provided me with a lot of information that is suitable for my teaching needs."

The teachers seemed very satisfied with the program as it addressed their needs and their reasons for attending this program. This is consistent with the results of Bayar (2014), who concluded that the most successful type of program is when professional development activities specifically address the individual needs of teachers.
In addition, the data showed that the teachers liked the program's aims, content, and structure. The teachers indicated that the program was well designed and comprehensive. Moreover, the teachers liked the activities in the program, trainer support, and the continuous feedback on their learning:

"Despite the short duration of the training program, it was comprehensive and wonderful. I liked the way of sequencing the ideas and simplifying the scientific material. I enjoyed the training program."
"The program was well designed and organized, and the information was relevant, sequentially taught, and clear. And this made it easy for us to understand the new information."
"The program included a lot of activities that are related to the central ADDIE skills, and we had the opportunity to practice them all. The trainer provided us with sufficient feedback."
"I liked the case studies that we worked on in the program; they were all relatable. This made it easy to connect the new knowledge with their applications in the real world."
"It was a good experience to share our educational problems with other teachers from different schools and regions and discuss how to find solutions to them."

In terms of the teachers' skills, the data showed that the

ADDIE training program enhanced different teachers' skills in addition to problem solving skills; the program helped the teachers evaluate and improve their teaching performance in general. Teachers claimed that they learned to be more organized and better planners. With regard to problem solving skills, teachers indicated that they learned how to face their educational problems and design their solution:

"It was an important and useful program that contributed to the development of the teachers, which increased the quality of the educational process."
"I can now solve any educational problem, through planning and designing the best solution for me and others."
"I can design any course, by identifying the problems and designing the solutions."
"I learned how to evaluate and develop my performance as a teacher."
"I learned many organization and planning skills."

This is in line with the findings of Harder (2003)'s study, where he indicated that ID helps teachers to be more sensitive to meaningful patterns of information, and possess schemas that support problem analysis and guide strategic decision-making.
Other teachers claimed that the program was inspiring and motivational. The program motivated the teachers to develop their educational practices and adopt instructional design skills as a lifestyle. The teachers stated:

"I will not stop here, I will keep searching and studying about instructional design."
"I am very excited to apply what I learned next semester."
"Instructional design motivated me to develop and improve myself and my career."

Teachers' beliefs about teaching missions were changed as well. Some teachers indicated that their educational thinking was changed, and they started to understand how good teaching and learning should be:

"For me, many educational concepts have been changed, I love instructional design after this training program."
"I know the secret behind successful learning; it is good instructional design."

These findings regarding skills that can be enhanced by ADDIE were also seen in Harder (2003)'s quantitative study where he found that even a brief intervention in ID models can enhance teachers' self-awareness and metacognitive reflection about their teaching, and their satisfaction with their knowledge and skills. In addition, Schwier and Campbell (2007) stressed that instructional designers should think deeply about their practice and their professional and personal experiences in an environment of spiritual coherence.

Moreover, many teachers stressed the importance of the role of the trainer in encouraging them to continue using the ADDIE skills. The teachers indicated that they believed in using ADDIE skills because the trainer so strongly believed in the importance of these skills. Moreover, teachers indicated that the trainer was qualified and an expert in this field, as well as in coaching strategies. Some of their feedback was:
"The trainer was very qualified, and believed in the importance of the instructional design, which was reflected in our performance."
"The trainer has good coaching skills, and could deliver the information very smoothly."

This supports the findings in Bayar (2014)'s dissertation, where he stated that one important condition for any successful training program is having high-quality trainers.
The teachers also had some suggestions to generate additional benefit from this program: (1) provide long-term programs on ADDIE skills; (2) ADDIE training programs should be compulsory for every teacher; and (3) conduct longitudinal studies, which provide follow up on case studies and designs:

"I think this program should be a compulsory program for every teacher. I think every teacher should learn about ADDIE and coaching on how to apply their skills in the real world."
"I think the duration of the program was short, I hoped that the trainer would observe our designs and their implementations in the real world."

Conclusion

The researcher believes in the value of ID and its models such as ADDIE in improving teachers' professional development. This study provided empirical findings that support this argument. The findings of the study showed that coaching teachers on ADDIE skills could enhance their skills and especially their skills in solving educational problems. Practicing ADDIE skills provides teachers with systemic thinking that helps them deal with educational issues in systematic ways. Teachers' attitudes toward ADDIE were also very encouraging with regard to continuing to provide this training in any future professional development programs. The researcher requests that the Ministry of Education consider these findings, begins to provide compulsory courses in ID for pre-service teachers and comprehensive ID training program for in-service teachers. With regard to the limitations of this study, future research could be conducted with male teachers and the results compared with the findings of this study. Moreover, longitudinal-trend studies should be conducted to follow teachers'

practices of ADDIE skills in a real environment. This study suggests future research that addresses the effectiveness of ID models in other teachers' competencies as well.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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The degree of using meta-cognitive thinking strategies skills for problem solving by a sample of biology female teachers at the secondary stage in the State of Kuwait

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The study aims to identify the degree of using meta-cognitive thinking strategy skill that relates to problem solving by teachers in the State of Kuwait and to investigate whether there is a statistical significance of using the skills of meta-cognitive strategies on solving problem related to their years of experience and their educational area. The current study followed the descriptive and analytical method that is the most appropriate for educational studies particularly that have to with correlation studies and the study of the relationships between variables. The research tool is represented in a list of thinking of meta-cognition that is distributed in (36) items that are basically under four dimensions including understanding the problem, setting a plan for solution, control and evaluation. The research sample that was analyzed contained (204) members. They are teachers who teach biology at secondary school in the state of Kuwait that is, 50% of the total number of female teachers in the State of Kuwait who are actually working in the whole six educational areas available in the state of Kuwait. The survey was electronically distributed via social media platforms because of Corona Virus pandemic witnessed by the State of Kuwait and the world. The research findings showed the degree of using the skills of meta-cognitive strategy that relate to problem solving by the research sample in the State of Kuwait was high despite of the different degrees of each strategy. The results indicated there is not a statistical significance of applying the skills of meta-cognitive strategies on solving problem by the research sample belong to their years of experience and the educational area they work in.

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Key words: Strategy, strategies of meta-cognitive thinking, understanding the problem, setting a plan for solution, control, evaluation.

INTRODUCTION

Metacognitive thinking skills are one of the main predictors of success not only inside the classroom but also beyond. Learners who are able to access their own cognitive processes and reflect on what and how they are learning are able to learn more effectively. For some learners, metacognitive thinking seems to come naturally,

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but most need a little aid to get to what is hidden in their own thinking process. Just like any other skill, meta-cognitive skills can be fortunately taught and developed.

Metacognition as a concept consists of two terms. They are ‘meta’ and ‘cognition’. Together they are translated into ‘beyond thinking’. The term itself was first unveiled in 1976 by John Flavell, who is a well known American psychologist (Flavell, 1976). Flavell defined metacognition as being mindful of one’s own cognitive processes and having the ability to use that knowledge to purposefully regulate those cognitive processes (Al Kheken and Attom, 2014).

Metacognition is a uniquely human capacity. Humans are able to turn what they really observe inward to think about what they know, need to know, and what ways they can use to solve any problem. Metacognition is what makes learners to go back a little bit and think through troubles rather than reacting simply. Metacognitive thinking allows learners to learn from prior experiences, generalize ideas so they can apply strategies when dealing with new situations, evaluate the use of different strategies, and determine how they might do things in different way next time (SaadAllah, 2014). Thinking about thinking means an individual’s awareness, and understanding of what is learnt; the ability to observe the self and evaluate cognitive actions in relation to learning. It also refers to reviewing the emotional self to see if one’s goal has been achieved or not, and organizing work by selecting the appropriate strategy (Amin, 2009).

Metacognitive thinking is very significant because it is related to learners’ ability to overcome and adapt. As learners do their best to think about their own thinking process, they begin to understand themselves in much better ways. Those learners who use metacognitive thinking may also think about their process in achieving their goals. They are able to find what works best, and what can be better (Callender et al., 2016).

Moreover, the significance of metacognition strategies is represented in their basic role in the educational process, as they focus on the ability of the learner to plan, monitor, control, and evaluate his or her learning, as well as they work to develop learners' acquisition of different learning processes, and allow them to assume responsibility and control in the processes related to education. Metacognition strategies facilitate the active building of knowledge and help in the development of independent thinking as well (The Pakistani, 2015).

Cox (2005) indicated that metacognitive skills can be taught to learners to develop their learning. That is simple because learners who have got well-developed skills of metacognitive may think through a problem or approach a learning task. They may also choose suitable strategies and make decisions to resolve any problem then perform any task successfully. Also learners with developed cognitive thinking tend to think about their own thinking processes and take time to think about and learn from their mistakes inside or outside the classroom. The strategies of metacognitive thinking strategies refer to ways learners may use to understand; in other words, it means processes designed for them to ‘think’ about their ‘thinking. In such a way, teachers can positively affect learners with learning disabilities by helping them to improve a suitable plan for understanding information (Kleitman and Narciss, 2019). Metacognitive strategies are the awareness monitoring of learner’s cognitive strategies to achieve determined objectives; for example when one learner asks himself or herself questions about his/her homework and then observes how well he or she answers the questions (Kurt and Kurt, 2017).

METACOGNITION IN PROBLEM SOLVING

Two dimensions of metacognitive ability have been recognized. They are knowledge of cognition, and regulation of cognition (Flavell, 1978). Humans begin learning the moment they are born and never stop Cognition is how learners learn. Each learner depends on different rates of cognitive skills to comprehend and remember what he or she reads, sees or hears. That simple depends on the topic, the context and personal experiences (Chan, 2010).

Anandaraj and Ramesh (2014) indicated that there is a significant correlation between learners’ metacognition and problem solving ability. Metacognition is more effective in the environments of learning in which metacognitive thinking strategies are provided during problem solving process

Kapa (2001) clarified that understanding when and how learners use metacognitive strategies plays a vital role in their success during problem solving process.

However, metacognitive thinking may get learners to monitor their understanding and organize their learning and problem solving processes (Teong, 2003). For problem solving, there are two basic metacognitive skills. They are self-monitoring and planning (Derry and Hawkes, 1993). Self-monitoring refers to the ability of learners to self-check during problem solving process. Planning is simply the ability of learners to divide a problem into small parts that can be solved in any appropriate way (Harandi et al., 2013).

Kapa (2001) proposed a metacognitive approach to teaching of problem solving. The approach included specifically five steps. They are identification of the problem, representation of the problem, planning, performance of planning and assessment. Havenga et al. (2013) also gave a guideline for the same metacognitive approach to problem solving consisting of five levels that are 1) identifying the problem by highlighting the basic points and writing down the most major essentials, revision and planning the problem, 2) suggesting the solution, 3) planning the following step by input, process and output, 4) reflecting on motivation for decision making and 5) applying the suggestion and

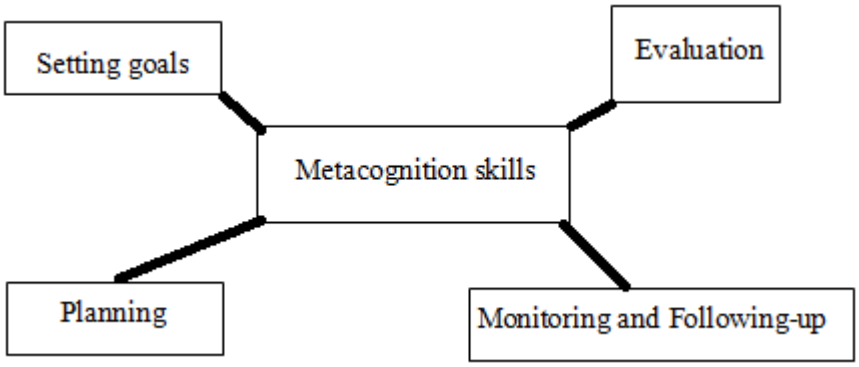

Figure 1. Metacognition skills.

writing down the outcome later on to develop it.

However, Garner (1987) clarified that good learners appear to have more knowledge about different aspects of memory such as capacity limitations, rehearsal, and distributed learning. Hartman (2002) observed that even when learners do not know what to do, they may fail to solve familiar problems. But what is interesting is that learners may find a solution immediately without even discussing why that solution is appropriate and others not.

METACOGNITION STRATEGIES

Metacognitive strategies are just the decisions that any learner makes before, during and after the process of learning. There are several metacognitive strategies that aim at developing learners' metacognition as follows (Figure 1).

Planning

At the beginning of any learning activity, the teacher has to make learners familiar with steps and rules in problem solving. The teacher also has to clarify time restrictions and goals that have to do with the learning activity so that they can be clear to all learners. Consequently, learners will keep all these things in mind during the learning activity. Learners can then assess their performance against them (Mbato, 2013).

Monitoring and following-up

During the learning process, teachers have to keep the target in focus. Monitoring and controlling refers to maintaining a sequence of operations or steps, knowing when a sub-goal will be achieved, knowing when to move to the next process, selecting the relevant process to follow in the context, discovering obstacles and errors and knowing how to overcome obstacles and getting rid of mistakes (Medina et al., 2017).

Evaluation

Evaluation means the ability to analyze performance and effective strategies following the occurrence of learning or solving problems. It refers to the individual's evaluation of learning processes and includes the evaluation of progress in learning activities. The assessment skill can help pupils to develop a set of necessary skills and strategies that can help them in the learning process and improve it (Özsoy et al., 2017).

Teachers can enhance metacognitive thinking if they guide their learners to evaluate the learning activity. This is simple can be done through two sets of criteria by which learners could be asked to evaluate the learning activity. For example, they can be asked whether they like or dislike the learning activity or what may help them more during the process of learning. Teachers in such a case get learners to keep the criteria in mind when classifying their views and opinions about the learning activity to motivate the reasons for those opinions (Ornstein and Hunkins, 1998).

Goals setting

Goals can be defined as expectations about the intellectual, social and emotional outcomes for learners as a consequence of their classroom experiences. These goals enhance learners' ability to be self- regulated in various circumstances (Cross and Paris, 1988).

Goals are often classified in two methods. They are mastery goals and performance goals. Mastery goals refer to process, learning, and development of competence. Performance goals have to do with social comparisons, orientations or demonstrating competence to one's peer group (O'Neill, 1992).

Goal setting as an aspect of metacognitive thinking

strategies comes with a theoretical basis. It is necessary to consider how such a theoretical basis can be translated in the classroom. When understanding what goals fit in practice, they might be helpful to think of goals on more than one time. That is, not all goals will have the same scope; meaning that some goals will be comprehensive and highlight all needs, and some will be more specific on individual parts of the task used to achieve the overall assignment (Shannon, 2008). As a very basic component and a source of meaningful teaching, the role of metacognitive thinking occupied a very good extent. However, the controversial issue is deciding how, when and why metacognition should be integrated in the curriculum so that it can be an essential strategy of teaching (Papaleontiou-Louca, 2003).

Haiduc (2011) indicated that teaching metacognition is crucial in the process of learning. So learners are to be aware that they use metacognitive thinking but they need to organize their skills in order to be able to achieve all the above mentioned strategies of metacognitive thinking. Then learners will turn into self-directed ones. Once learners become experienced with strategies of metacognitive skills and self-directed ones, they do not need guidance. Then they will be able to control and manage and put their all thoughts in the right direction (Shannon, 2008).

Despite all developments in the curriculums at the secondary stage in the state of Kuwait during the last years, it is still very necessary to rely on new strategies just like metacognitive thinking strategies that can go along with the development of learning and move the process of learning from teacher to learner. That is why the two researchers conducted the current study that aimed at identifying the degree of using metacognitive thinking strategies in solving problem by teachers at the secondary stage in the state of Kuwait. Meanwhile, San`ani and Radwan (2020) found that there are high levels related to metacognition strategies, meaning that, as indicated by Iwai's research (2019), they are very keen to choose and use metacognitive thinking strategies that are appropriate for their needs, and their development.

METHODOLOGY

The methodology adopted is the qualitative method. A survey with quantitative treatment in which the data processed through the SPSS were applied. The current research aims to identify the degree of using strategic metacognitive skills to solve problems by teachers in the State of Kuwait (understanding the problem - Planning - monitoring – evaluation).

The research sample was selected randomly. The research sample consisted of teachers who teach biology in grades 11th and 12th. The survey sample consisted of 204 teachers from schools who are actually related to over six educational zones in Kuwait, which are (Al Asema Educational Area – Al Farwaniya – Al Jahra - Mubarak Al-Kabeer – Al Ahmadi and Hawalli), in addition to a number of private schools. As for the study sample that was subjected to analysis, it amounted to 204 teachers, that is, about 50% of the total number of teachers in the State of Kuwait, according to the latest statistics of the Ministry of Education. The Preparation of survey is closely related to the variables of the study, as the study aims to recognize the most important strategic metacognitive skills that solve the problem of teachers in the State of Kuwait. So the survey that was built and used in the current study is as follows:

(i) The metacognition list: The metacognition list was used by teachers prepared and developed by the researchers after reviewing the previous educational literature related to the metacognitive thinking field, as it contains all metacognitive components, and has high validity and reliability.
(ii) Description of the meta-knowledge list: it contains (36) paragraphs distributed over (4) dimensions as follows (Table 1).

The validity and reliability of survey

For a questionnaire to be regarded as acceptable, it must possess two very basic characteristics which are reliability and validity (Litwin and Arlene, 1995).

Reliability

To reduce the memory effects and make sure the respondents answer the survey questions different from the way they answer in the first time, the researchers gave the survey to the same group of respondents at a later point in time and repeated the research. Then, they compared the responses two times. The results showed the responses are different in both times

Validity

First, the researchers have two people who understood the topic and went through the survey. They checked if the survey captured the topic under investigation effectively. Secondly, the researchers got two experts from Kuwait University- Department of Education on survey construction to check it out for double and confusing items.

The survey

Eventually, the researchers prepared the final research survey used after ensuring its reliability and validity. The research survey was applied to the final sample consisting of (204) teachers in the State of Kuwait. The data were coded and transferred to the SPSS Statistics Program, and appropriate statistical methods were made of frequencies, percentages, means and standard deviations in order to answer the research paper questions and verify the validity of the hypotheses.

The research hypotheses

(i) The degree of using the skills of meta-cognitive strategies that relate to problem solving by the research sample is high.
(ii) There is a statistical significance of applying the skills of meta-cognitive strategies on solving problem by the teachers – the research sample- based on their years of experience and their educational area

RESULTS AND DISCUSSION

Data were collated, analyzed, triangulated, and documented in a narrative form using three thematic

Table 1. A list of metacognition skills.

S/N	The skill	Clause No.
1	Understanding the problem	5-13
2	Developing a plan for the solution	14-24
3	Monitoring	31-25
4	Evaluation	32-40
Total	**36 Items**	

Table 2. Means and standard deviations of teachers using of metacognition skills that are related to solving problem in the secondary schools of the State of Kuwait.

S/N	Rank	Field	Mean	St	The degree
1	4	Evaluation	4.33	0.531	High
2	3	Monitoring	4.32	0.576	High
3	2	Understanding the problem	4.27	0.536	High
4	1	Setting a solution	4.01	0.624	High
Total			4.22	0.501	High

headings:

Using the skills of metacognition stategies by teachers

To test the first hypothesis, means and standard deviations of the degree of use of biology parameters at the secondary stage in the State of Kuwait were extracted from strategic metacognitive skills related to problem solving. Table 2 illustrates this. Table 2 shows that means ranged between 4.01-4.33, where the evaluation came first with the highest mean of 4.33 and a high degree of appreciation; while the development of a solution plan came last with a mean of 4.01 and a degree of appreciation. The average of the tool as a whole was 4.22 with a high degree of appreciation. The means and standard deviations of the estimates of the study sample individuals were calculated on the paragraphs of each field separately as follows**.**

Understanding the problem

Table 3 shows that the means ranged between 3.97 and 4.67, where item No. (7) which states “I encourage students to ask scientific questions and inquiries with what they think is difficult for them in their own language” came first, with mean of 4.67 and a high degree of appreciation; while items No. 9 and 11, “The female students draw illustrations of the parts of a living creature, for example in their own style, “I instruct the students to analyze and comprehend the dimensions of the scientific problem ” were last, with a mean of 3.97 and a high degree of appreciation. The mean for understanding the problem as a whole was 4.27, with a high degree of appreciation.

Setting a solution

Table 4 reveals that the means ranged between 3.46-4.55, where item 14 came first: "I accept the ideas and opinions of the scientific student and do not underestimate their importance even if they are outside the course", with mean of 4.55 and a high degree of appreciation; while item No. (16) “I ask students, for example, to draw a picture of nerves while they are in a case of heart disease and compare it with a picture of nerves while it is in a normal state” came last, with an average of 3.46. The total mean for developing a plan for the solution as a whole was 4.01, with a high rating.

Monitoring

It is evident from Table 5 that the means ranged between 4.07-4.56, where item No. (30) which states “I ensure the classroom environment is suitable for effective learning and problem solving” came first with mean of 4.56 and a high degree of appreciation; while item No. (26), “I make sure that the students rely on themselves in solving scientific problems,” came last, with mean of 4.07 and a high degree. The mean of the control as a whole was 4.32, with a high degree of appreciation.

Evaluation

Table 6 shows that the means ranged between (3.98-4.63), where item No. (32) came first “I follow the

Table 3. Means and standard deviations of the first field.

S/N	Rank	Item	Mean	Standard deviation	The degree
1	7	I encourage students to ask scientific questions in their own language.	4.67	0.593	High
2	6	I guide students by reading scientific terms and concepts in a clear and audible voice.	4.51	0.616	High
3	5	I encourage students to reflect on scientific terms and concepts before illustrating them.	4.43	0.762	High
4	8	I encourage students to show their interest in terms and practical concepts.	4.41	0.699	High
5	10	I direct the students to use the available data to define the problem.	4.20	0.825	High
6	12	I guide students in practicing the skill of mental visualization to understand the dimensions of the scientific problem.	4.19	0.881	High
7	13	I direct the students to reformulating the scientific problem in their own language to ensure correct understanding of the scientific problem.	4.12	0.874	High
8	9	I direct the students to draw illustrations of the parts of a living creature, for example, in their own style.	3.97	0.957	High
9	11	I order the students to analyze and understand the dimensions of the scientific problem.	3.97	0.887	High
Total			4.27	0.536	High

Table 4. Means and standard deviations of the second field.

S/N	Rank	Item	Mean	Standard deviation	The degree
1	14	I accept the ideas and opinions of the scientific student and do not underestimate their importance, even if they are outside the course.	4.55	0.783	High
2	18	I encourage students to draw mental maps and correct alternative perceptions of some scientific concepts and terms.	4.36	0.772	High
3	19	I train students in the steps of mental mapping and the development of educational achievement.	4.36	0.804	High
4	22	I direct the students to determine the steps required to achieve each goal.	4.11	0.932	High
5	15	I ask the students to collect all the information that may be useful in solving or understanding the established scientific questions.	4.02	0.882	High
6	20	I ask students to show similar problem-solving methods that they previously used.	4.00	0.851	High
7	23	I direct the students towards clarifying their way of thinking about the solution by translating it on the solution paper	4.00	0.949	High
8	21	I direct the students to divide the problem into several small goal.	3.88	1.015	High
9	17	I instruct students to search for more information from outside the course on a specific subject	3.73	1.046	High
10	24	I direct the student to clarify her way of thinking about the solution by speaking out loud, as if she were speaking herself	3.65	1.171	High
11	16	I ask the students, for example, to draw a picture of the nerves while they are suffering from heart disease and compare it with a picture of nerves while they are in a normal condition.	3.46	1.080	High
Total			4.01	0.624	High

students' solution and seek to correct and direct the wrong answers in a scientific and calm manner, with mean of 4.63 and a high degree; while item No. (38) "I ask students to compare what have been reached with situations or problems that I specify for them" came last with mean of 3.98 and with a high degree. The average for the evaluation as a whole was 4.33, with a high degree of appreciation. To test the second hypothesis,

Table 5. Means and standard deviations of the third field.

S/N	Rank	Item	Mean	Standard deviation	The degree
1	30	I ensure a safe classroom environment suitable for effective learning and problem solving to occur.	4.56	0.660	High
2	31	I help students to explain all practical concepts and terms in a number of ways.	4.50	0.662	High
3	28	I observe and direct the student's behavior after knowing her failure to reach the correct solution to the problem.	4.37	0.829	High
4	29	I make sure that the student expresses her point of view, and is not restricted to the opinions and ideas of her colleagues.	4.30	0.784	High
5	27	I direct students when solving scientific problems cooperatively.	4.29	0.837	High
6	25	I monitor the students' use of appropriate problem-solving strategies.	4.11	0.876	High
7	26	I make sure that the student relies on herself in solving scientific problems.	4.07	0.882	High
Total			4.32	0.576	High

Table 6. Means and standard deviations of the fourth field.

S/N	Rank	Item	Mean	Standard deviation	The degree
1	32	I follow the students 'solution and strive to correct and direct the wrong answers in a calm and scientific manner.	40.63	0.602	High
2	35	I discuss with the students about the validity of their solution.	40.55	0.630	High
3	36	Use ongoing evaluation strategies as students practice problem solving.	40.49	0.705	High
4	34	I use a follow-up card in which I assess the level of students.	40.45	0.770	High
5	40	I direct the students to review the solution and its steps to ensure its validity.	40.35	0.703	High
6	33	I give an opportunity for groups that are unable to create mental maps have access to the maps of other groups.	40.31	0.848	High
7	37	I ask the students to make sure of the solution by applying it and using it in similar situations.	40.17	0.868	High
8	39	I command the students to present and discuss the solution they found, and clarify its logic and significance.	40.09	0.866	High
9	38	I ask students to compare their findings to situations or problems that I identify for them.	30.98	0.896	High
Total			4.33	0.531	High

means and standard deviations were extracted for the use of metacognition strategies in solving the problem of teachers according to their educational area variables and years of service. Table 7 illustrates this. The results of the previous table illustrate an apparent variation in the mean and standard deviations of metacognitive strategies in solving the problem of teachers due to the different categories of educational region variables and years of service. To demonstrate the significance of the statistical differences between the means, the multiple bilateral variance analysis on the fields the binary variance analysis of the tool as a whole was used as shown in Table 8.

Based on the results included in the previous table, the following is evident:

(i) There were no statistically significant differences (= 0.05) due to the effect of the educational area in all fields except for monitoring and evaluation.
(ii) There are no statistically significant differences (=0.05) due to the impact of experience in all fields except for evaluation.

Based on the results of the previous table, it can be said that there are no statistically significant differences (ه= 0.05) due to the effect of the educational area, where the P-value was 2.405, with a statistical significance of 0.069. Also there were no statistically significant differences (ه=

Table 7. Means and standard deviations of using metacognition strategies to solve problem by teachers according to the variables of educational area they belong to and years of service.

Variables			Understanding the problem	Setting a solution	Monitoring	Evaluation	Total
The educational area teachers belong to	Al Ahmadi	Mean	4.36	3.93	4.20	4.19	4.16
		St. deviation	491	0.580	0.517	0.476	0.462
	Mubarak Al Khabir	Mean	4.21	3.92	4.26	4.28	4.15
		St. deviation	637	0.761	0.650	0.636	0.595
	- Al Asema -Hawalli Al Jahra Private Education	Mean	4.32	4.21	4.53	4.57	4.39
		St. deviation	493	0.519	0.524	0.407	0.431
	Al Farwaniy	Mean	4.18	4.01	4.29	4.33	4.18
		St. deviation	515.	0.598	0.578	0.532	0.489
Years of service	Less than 5 Years	Mean	4.12	3.89	4.21	4.17	4.08
		St. deviation	0.525	0.601	0.604	.604	0.465
	5 - less than 10 Years	Mean	4.35	4.10	4.41	4.49	4.32
		St. deviation	0.567	0.614	0.511	0.434	0.469
	10 Years and more	Mean	4.28	4.01	4.30	4.31	4.21
		St. deviation	0.518	0.633	0.596	0.536	0.520

Table 8. The multiple bilateral variance analysis for the impact of educational area teachers belong to and years of service on the fields of metacognition strategies.

Variance	Fields	Sum of squares	Degrees of freedom	Mean of squares	F value	Significance
The Educational Area	Understanding the problem	0.994	3	0.331	1.169	0.323
	Setting a solution	2.564	3	0.855	2.244	0.084
	Monitoring	3.125	3	10.042	3.252	0.023
	Evaluation	3.665	3	10.222	4.725	0.003
Years of service	Understanding the problem	0.895	2	0.448	1.578	0.209
	Setting a solution	0.753	2	0.376	.988	0.374
	Monitoring	0.663	2	0.332	1.035	0.357
	Evaluation	2.020	2	1.010	3.906	0.022
The mistake	Understanding the problem	56.145	198	0.284		
	Setting a solution	75.424	198	0.381		
	Monitoring	63.432	198	0.320		
	Evaluation	51.194	198	0.259		
Total	Understanding the problem	58.255	203			
	Setting a solution	78.931	203			
	Monitoring	67.415	203			
	Evaluation	57.197	203			

0.05) due to the effect of experience, where the p-value was 2.095, with a statistical significance of 0.126 (Table 9). It is clear that there are statistically significant differences (ه= 0.05) between Al-Ahmadi, Al Asema, Hawalli, Al-Jahra and private education, and the differences came in favor of the capital, Hawalli +, Al-

Table 9. Binary variance analysis for the impact of educational area teachers belong to and years of service on using metacognition strategies when solving problem.

Variance	Sum of squares	Degrees of freedom	Mean of squares	F Value	Significance
The educational area	1.749	3	0.583	2.405	0.069
Years of service	1.016	2	0.508	2.095	0.126
The mistake	47.996	198	0.242		
Total	50.974	203			

Table 10. (Post Hoc) Scheffe test for the impact of the educational area belong to on monitoring and evaluation.

		Means	Al Ahmadi	Mubarak Al Khabir	Al Asema-Hawalli- Al Jahra- The private education	Al Farwaniya
Monitoring	Al Ahmadi	4.20				
	Mubarak Al Khabir	4.26	0.07			
	Al Asema-Hawalli- Al Jahra- The private Education	4.53	0.34*	0.27		
	Al Farwaniya	4.29	0.09	0.02		
Evaluation	Al Ahmadi	4.19				
	Mubarak Al Khabir	4.28	0.08			
	Al Asema-Hawalli- Al Jahra- The private Education	4.57	0.37*	0.29		
	Al Farwaniya	4.33	0.13	0.05	0.24	

Table 11. (Post Hoc) Scheffe test for the impact of years of service on evaluation.

		Mean	Less than 5 Years	5 – less than 10 Years	10 Years and more
Evaluation	Less than 5 Years	4.17			
	5 - less than 10 Years	4.49	0.32*		
	10 Years and more	4.31	0.13	0.19	

Jahra, and private education in both monitoring and evaluation (Table 10).Table 11 reveals the existence of statistically significant differences (ه= 0.05) between less than 5 years and 5 - less than 10 years, and the differences came in favor of 5 - less than 10 years.

Conclusion

After presenting the results of the research, it can be concluded that the degree of use of teachers who teach biology at the secondary stage in the State of Kuwait in terms of metacognition strategic skills related to solving the problem was high despite the difference in the degree of significance of each strategy. This indicates the importance of these strategies for them in solving any problem. This result supports the research of both San`ani and Radwan (2020), which also found that there are high levels related to following metacognition strategies; this means that, as indicated by Iwai's research (2019), they are very keen to choose and use metacognitive thinking strategies that are appropriate for their needs, and development.

It also became clear after conducting the appropriate statistical tests that there is no statistically significant effect in the use of metacognitive strategies in solving the problem among teachers due to the educational area variable to which they belong. This indicates that all the educational districts to which the teachers belong have an equal degree with regard to the significance of using metacognition strategies in solving problems. It was also found that there is no statistically significant effect in the

use of metacognition strategies in solving problems among teachers according to years of service. Experience is not the factor that governs or determines the use of metacognitive strategies. This result is consistent with the results of the research of San`ani and Radwan (2020).

As for the open questions that were presented to the teachers related to the factors that affect their pursuit of metacognition strategies in every class, it came in their entirety that the administrative and technical burdens were placed upon them including the numerical density of students in each classroom, lack of time, shortage of the class, lack of tools necessary for the educational process, the frequent forced transfers between schools or between school districts and the instability of school administrations which are usually subject to rotation from time to time.

On the other hand, a number of teachers stated that there are some obstacles they encounter particularly during the use of metacognition strategies including workbook besides the curriculum. This created a load upon the teacher job, too much written and oral tests and ongoing assessments and so on. The results indicated that teachers did not get the appropriate training to practice metacognition skills inside the classroom as they follow such skills according to their own efforts. Therefore, the researchers suggest the following:

1) Investing the highest level of metacognition skills for teachers in the state of Kuwait to increase the social and psychological compatibility by full integration into curricular activities and activities specifically associated with the educational curriculum.
2) Identifying the factors that enhance the highest level of metacognition skills for teachers in the State of Kuwait in order to activate and generalize them for all grades.
3) Working to overcome everything that hinders the adoption of teachers, not the strategy of thinking metacognitive.
4) Conducting research papers on metacognition skills in all different grades.
5) Comparing the personal characteristics of high-level female teachers to follow metacognitive strategies in solving problems among teachers in the State of Kuwait at the secondary level with other teachers and the rest of the subjects in order to identify the factors that limit the adoption of metacognitive thinking strategies.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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