Publishing
INASED

International Journal of Progressive Education

1554 - 5210

IJPE
INASED Published ©

ijpe.inased.org

IJPE International Journal of Progressive Education

Volume 21 Number 5 October 2025

An International Journal Published by International Association of Educators (INASED)

International Journal of Progressive Education

Frequency: Six times a year.

ISSN: 1554-5210

Owner & Publisher: International Association of Educators

Indexing/Abstracting:

1. **H.W. Wilson (Education Full Text)**: https://www.ebsco.com/m/ee/Marketing/titleLists/eft-coverage.htm
2. **EBSCO Publication**: http://www.ebsco.com
3. **Cabell's Directory of Publishing**: http://www.cabells.com
4. **Ulrichsweb:** http://ulrichsweb.serialssolutions.com/
5. **Open AIRE:** https://www.openaire.eu/

2025 Subscription Rates

- $120 Association Member USA (Canada: $130; Rest of World: $140)
- $140 Individual USA (Canada: $150; Rest of World: $170)
- $110 Student USA (Canada: $120; Rest of World: $140)
- $240 Library/Institution USA (Canada: $260; Rest of World: $360)
- Single Issues and Back Issues: $35 USA (Canada: $45; Rest of World: $55)

If you wish to subscribe for the printed edition of IJPE, please contact the Customer Service department at secretary@inased.org

TABLE OF CONTENTS

Volume 21, Number 5
October 2025

Articles

International Journal of Progressive Education, Volume 21 Number 5, 2025

Effect of Educational Coaching Uniquely Designed with the GROW Model in Science Teaching on Motivation toward Science and Achievement

Hatice Didar Uçaş*
Ministry of National Education (Türkiye)

Halil İbrahim Yıldırım**
Gazi University (Türkiye)

Abstract

This research aimed to investigate the influence of educational coaching that was uniquely designed with the GROW model in science teaching on the motivation and success levels of 7th-grade students in science lessons. The investigation was implemented with 7th-grade pupils in a middle school in Turkey in 2024 and lasted 14 weeks. The investigation was performed using a quasi-experimental, pretest-posttest control group experimental design. Measuring instruments (Scale of Motivation for Science Course-Science Achievement Test) were used as pre-, post-, and follow-up tests. The pupils' success in the science lesson was also evaluated by comparing their lesson grades in the first and second semesters. Students in the control and experimental groups received student-centered training; however, those in the experimental group also received 20 minutes of face-to-face educational coaching every week. During the educational coaching process, activities were performed for students to know themselves, see their weaknesses and strengths, strengthen their weaknesses, reveal their potential, identify factors that have a negative effect on motivation, learning, and achievement, and overcome them. At the start of the research, pupils in the control and experimental groups had like achievement, science scores, and motivation. However, at the completion of the study, the success-motivation points and science grades of the pupils in the experimental group were meaningfully greater compared with those in the group under control. Additionally, pupils in the experimental group had meaningfully higher achievement and motivation follow-up test points than those in the control group. Stated differently, educational coaching, uniquely designed with the GROW model, had a meaningful influence on the rise of motivation and achievement levels in science. Based on the study results, educational coaching should be comfortably included in the science teaching process.

Keywords: Coaching, Educational Coaching, Science Education, Motivation, Success

* ***Hatice Didar Uçaş***, Ministry of National Education, Kırşehir District National Education Directorate, e-mail: didarucas@gmail.com ORCID ID: 0009-0009-7390-483X

** ***Assoc. Prof. Dr. Halil İbrahim Yıldırım*****,** Gazi University, Gazi Faculty of Education, Department of Mathematics and Science Education, ORCID ID: 0000-0002-8836-8349

Correspondence**:** halily@gazi.edu.tr

***A part of this research study was produced from the master's thesis of Hatice Didar Uçaş.

Introduction

Traditional teaching methods are being replaced by modern, age-appropriate teaching strategies based on scientific and technological advancements. New ideas and methods are introduced due to the shift to training and education methods that are parallel with advances in science and technology. Coaching is one of these concepts (Karabacak, 2010). Coaching is an effective practice that helps people accomplish their goals and promotes learning and self-improvement. To accomplish objectives that are mutually agreed upon, coaching is a reciprocal sharing of experiences and viewpoints among the coach and the human being coached (Çatalbaş, 2016). People can enhance their performance, learn new abilities, and improve their learning processes through the process of coaching (Özbay, 2008).

The aim of coaching is to increase people's capability and learning capacity; it employs techniques such as motivation and effective questioning (Landsberg, 1999), and eliminates barriers to achievement (Starr, 2004, p. 10). Coaching refers to guiding individuals in their personal development (Kulaç, 2002, p. 47). Coaching practices, including life-career-executive-educational coaching, have been documented in the literature (Atasayar, Bilgin & Güler, 2010). The examination of the relevant literature has revealed that, whatever its type of coaching, coaching is a technique for awareness-learning-transformation that persons can benefit from both in their educational and business lives. Because of its effects, some developed countries have taken notice of coaching and have adopted the idea of using it commonly in education as part of their educational policies (Can, 2023). Coaching practices such as life coaching, career coaching, and executive coaching have been practiced in Turkey for years; however, the concept of educational coaching has recently been employed in the country (Atasayar et al., 2010). Coaching has emerged as an approach that supports students' achievement in central placement exam processes in the Turkish education system (Can, 2023) and is applied under the names of educational coaching, academic coaching, and student coaching. These concepts are used in place of one another (Karabacak, 2010). The development of students' achievement was not the only aim of the coaching applied in this investigation. As the coaching process helps students learn about themselves, improve their motivation and social development, create active learning habits, and recognize and overcome challenges on their path to success, the term "educational coaching" was addressed in this study. Educational coaching refers to a powerful partnership between a coach and a student in an educational setting to support students' development. Educational coaching enables students to know themselves, set their goals associated with the fields they can improve, and acquire learning skills (Ministry of National Education [MNE], 2019). The purpose of educational coaching is also to aid pupils reach their objectives and enhance their academic performance. Educational coaching is a planned developmental interaction process based on allowing students to explore their strengths-weaknesses and find resolutions to their problems (Çatalbaş, 2016). Coaching support can make it possible to help students become independent learners, open up pathways for them to think in complex ways, and equip them with learning and problem-solving skills for their lifelong learning journey. Providing this support by a coach in an educational setting is critical. The fact that students receive help from an educational coach on the above-mentioned topics will support them in their lifelong development (Tümen Akyıldız, 2019). As a result of the implementation of coaching practices, students will become autonomous individuals who have become lifelong learners, can solve the problems they face, and take responsibility for their behaviors (Demir & Doğanay, 2009). The studies mentioned above show that coaching practices have a crucial role in individuals' journey of learning and development, which was one of the reasons why educational coaching was chosen as the topic of this study.

A coach plays an important role in educational coaching. A coach is a professional guide who acts as a companion in people's personal development journey and assists them in taking action in line with their determined objectives (Köktürk, 2006, p. 52). A coach maximizes a person's potential performance (Whitmore, 2003, p. 8), tries to help individuals achieve their goals, solve their problems, learn and develop, and facilitates problem solving (Hawkins, 2008, p. 32). A coach also continuously observes learners, contributes to their development and motivation, helps them find their objectives, and increases their self-confidence (Çam Tosun & Bayram, 2017). However, an educational coach is

neither a therapist nor a psychologist (Öz, 2015, p. 39). Educational coaches should recommend students to professionals, such as psychologists, when they observe abnormal behaviors in the students they interview. Educational coaching should be considered separate from mentoring, guidance, counseling, and counseling as well as from psychologists (Kalçık, 2017). An educational coach helps students learn about themselves, make the best use of their potential, take responsibility for their lives, and live a happier life (Yazır Özgür, 2012, pp. 9-15) As previous studies have shown, educational coaching is a process in which students know themselves, themes are discussed with students, the goals associated with these theme and actions to achieve the goals are determined, a special study and life plan are prepared for the student, learning deficiencies are identified, learning deficiencies are eliminated, and the obstacles to success-motivation are specified and overcome (Çam Tosun & Bayram, 2017; MNE, 2019).

During the educational coaching, a unique coaching plan has been designed using the GROW model, which was coined with the initials of the terms “Goal”, “Reality”, “Options”, and “Will”. These concepts indicate the stages to be followed in the model. The GROW is a model that can be easily implemented and taught by educators without needing an expert psychologist (Jenkins, 2009; Vardarlıer & Özsürünç, 2019). Because of this, the GROW model was applied in the present investigation. The individual’s goals are the main focus in the goal phase. In other words, the goals, how these goals are achieved, and evaluation points are determined. In the reality phase, issues regarding the objectives are explored, and information about the situation is collected. At this point, raising awareness is more crucial than finding solutions. The options phase involves exploring potential behavior or decision options that will lead individuals to the best solution. The individuals are expected to generate their own options. The last phase will include determining the steps that individuals will take to achieve their goals, investigating potential obstacles, discussing how to overcome these obstacles, and developing an action plan (Grant, 2011; Grant & Greene, 2001; Spence & Grant, 2007). The coach should apply the GROW technique effectively to achieve the goals of educational coaching. Accordingly, the researcher of the present study has received an educational coaching certificate.

The literature includes studies examining the impacts of educational coaching on success-attitude (Bulut, 2019; Kalçık, 2018; Taşkın, 2019; Yüksel, 2017), achievement and test performance (Çatalbaş, 2016), success (Karabacak, 2013), student development self-theory, academic self and achievement (Akdağ, 2024), self-confidence level (Combs, 2015), self-efficacy beliefs (Singley, 2017), self-awareness (Richman, Rademacher and Maitland, 2014). Some studies have also examined the effects of hybrid coaching on learning (Aydoğdu, 2022; Fidan, 2018), cognitive coaching on cognitive awareness and achievement (Ceylan, 2011; Demir, 2009); achievement, attitude and cognitive awareness (Ceylan, 2011), success (Duman, 2013; Tümen Akyıldız, 2015), cognitive flexibility and problem solving skills (Turhan, 2022), and teachers’ professional practices (Bjerken, 2013). In addition, Çam Tosun and Bayram (2017) examined the opinions of teachers and students on student coaching; Pınar (2013) investigated the correlation between classroom instructors’ coaching competencies and pupils’ success in exams.

The conclusions of the abovementioned investigations report the positive influence of coaching practices on achievement. The current investigation is different from the above investigations in some ways. First, in this study, the educational coaching was conducted over the academic semester. Second, this investigation used the GROW coaching model. Third, the goal action and the target action plans were evaluated in weekly interviews during the study, and the students were guided toward their objectives. Fourth, educational coaching forms were used. Fifth, the influence of educational coaching on pupils’ accomplishments in the science lesson was determined using the Science Achievement Test (SAT) and the pupils’ science course grade point averages (SCAG) in the first, and second semesters. Finally, this study examined whether the changes in students’ achievement and motivation were permanent or not using a follow-up test. The literature has indicated that there are very few investigations on motivation, which is one of the goals of educational coaching. Thus, the present investigation investigated the influence of educational coaching on motivation. Based on the reasons mentioned above, this investigation was carried out to examine the influence of educational

coaching, which was uniquely designed with the GROW model in science teaching, on motivation and achievement in a science course.

Method

Design of the Study

The current investigation, which investigated the influence of educational coaching on participants' success and motivation regarding the science course, used the quasi-experimental method because students were not assigned to study groups using random sampling; 7th-grade classes in the educational institution where the study was implemented were included. The data collection tools were used as pre-, post-, and follow-up tests, and there was a control class in the investigation; therefore, it was also a study with an experimental design including pretest-posttest control groups (Karasar, 2016).

Study Groups and Characteristics

There were 16 female-14 male pupils in the experimental class and 17 female-13 male pupils in the control class. All of the participating pupils lived in the central neighborhood of the same district, an indication showing that the control and experimental classes were similar in terms of sex and socio-economic characteristics.

Sampling Method of the Research

The study sample was chosen from the 7th-grade classes that the researcher could easily contact; thus, it can be stated that the study used a convenient sampling method (Büyüköztürk et al., 2016).

Measurement Tools

Scale of Motivation for Science Course (SMSC)

The SMSC designed by Dede and Yaman (2008) was used to analyze the pupils' motivation regarding the science course. SMSC is a five-grade Likert-type scale that contains 23 items. The construct validity of the SMSC was evaluated using an exploratory factor analysis, and it was observed that the SMSC included five factors and explicated 47% of the total variance. The Cronbach's alpha reliability of the SMSC was 0.85. The SMSC was readministered to 319 middle school students after 3 weeks, and the reliability coefficient was found to be 0.82, showing that the SMSC was stable over time. The items in the SMSC included positive (n = 20) and negative (n = 3) statements. Scoring scale for the positive statements in the SMSC was as follows: "Totally Agree:5, Agree:4, Somewhat Agree:3, Disagree:2, and Strongly Disagree:1". Reverse scoring was applied to the items that contained negative statements. Before starting the study, the SMSC was administered to 412 students as proof of the reliability of the study data, and its reliability was calculated as 0.84.

Science Achievement Test (SAT)

The SAT, developed by the investigator, was used to examine the pupils' achievement levels in the science lesson. A four-option multiple test, the SAT covered the 7th-grade science course units of Light and Reproduction-Growth-Development. To analyze the learning outcomes sufficiently, 42 items were selected from the prepared item pool. Two experts examined the SAT using the specification table and evaluated it in terms of content validity and scientific error and, subsequently, needed revisions were made on the SAT. The SAT was administered to eight 7th-grade students to determine incomprehensible expressions, and the test was amended accordingly. The SAT was applied to 344 students who were taught these units, and then item analysis was performed. Items (n = 7) with an item discrimination index value < 0.20 were removed from the test, items (n = 6) with a

discrimination index between 0.20 and 0.30 were subject to major corrections, and items (n = 15) with a discrimination index between 0.30 and 0.40 were subjected to minor corrections. No corrections were made for items (n = 14) with a discrimination level > 0.40. The experts re-evaluated the SAT using the specification table and expert evaluation form in terms of content validity, and based on experts' opinions, it was concluded that content validity was achieved. At the conclusion of the test development, the KR-20 reliability of the SAT, which contains 35 items, was calculated as 0.87. Correct and incorrect items in the scale were scored as 1 and 0, respectively. In the SAT, the unit Light was measured using 19 items, and Reproduction, Growth, and Development, 16 items.

The success of the pupils in the study groups were compared using Science Course Average Grades (SCAG), with SCAG- I for the first semester (before the study) and SCAG-II for the second semester (after the study).

Implementation of the Study

The SMSC and SAT were applied as pretests at the beginning of the study. The units Light and Reproduction, Growth and Development were taught for 14 weeks. The 5 E model of instruction was used in the science education in the investigation groups. The investigator prepared teaching materials were prepared by the investigator before the research was began. In addition, a pilot research was implemented to define the potential issues and take the necessary precautions.

Implementation in the Control Group

The 5 E model, the application model of constructivist learning theory, was used in science teaching for the control group. Engage, explore, explain, elaborate, and evaluate phases forming the 5E model were implemented in a student-centered approach.

Implementation in the Experimental Group

Science lessons were similarly instructed to the pupils in the experimental class using the 5E model, along with educational coaching practices uniquely designed with the GROW. The educational coaching process was designed as follows: One theme was determined each week. “Student Goal and Action Plan” and ‘Student Goal and Action Plan Evaluation’ forms and those specified in the weekly implementation stages were used in the goal stage to determine the students’ goals related to the theme, in the reality stage to explore the problems for the goals, in the options stage to discover the options that will solve the problems, and in the will stage to develop an action plan for students to reach their goals. In this context, 20-minute educational coaching conversations were implemented with each of the pupils every week outside of the course. During the educational coaching, students were helped to get to know themselves, see their strengths and weaknesses, receive guidance to strengthen their weaknesses, and reveal their potential. The students were guided appropriately when they needed support and helped eliminate their cognitive deficiencies. Interactions between the coach, student, and parents were established through educational coaching interviews, and feedback was provided to students and parents. The activities carried out during these interviews for each week are described below. First, the student and his/her parents were informed about the educational coaching process, and an educational coaching agreement was signed between the student, parent, and educational coach. An "Education Coaching File," including the activities carried out, was prepared for each student and submitted to the school management.

A “Coaching Implementation Plan” was prepared for each activity to be done each week. Educational Coach Follow-up Form “Monthly Student Tracking Chart” and ‘Monthly Parent Tracking Chart’ were used for the topic and summary of each interview conducted during the educational coaching process, and ‘Monthly Evaluation Report’ and ‘End of Educational Coaching Process Evaluation Report’ were used for the educational coaching activities.

The following procedures were done every week: A “Student Goal and Action Plan” was made for the goals set at the end of the interviews, and what to do to achieve these goals. An evaluation of “Student Goal and Action Plan” was implemented to establish the achievement status of the goals, the reasons for failing to achieve the goals, and to find solutions to achieve them. All the activities within the educational coaching were specifically carried out in the science course.

In the first week of the coaching process, the students were met; within this context, activities were carried out to get acquainted with and establish a bond with them. Students completed the forms “About Me”, “Personal Development Assessment Form”, “Ideal Me”, and “Getting rid of Monotony”. Based on the data in these forms, students’ strengths and weaknesses were identified. Interviews were also conducted with parents.

In week 2, interviews were conducted to determine learning styles and to raise awareness about effective learning and learning strategies using the “Learning Styles Scale” and the “Multiple Intelligences Assessment Inventory”. Thus, each student’s learning style and, multiple intelligence areas were identified, and the students were interviewed about how they learn best. A road map was drawn with the students on how to study for effective learning. The study of “Attention and Focus while Studying” was also practiced to ensure that students concentrate and focus on studying. In addition, a suitable and flexible “Weekly Life Plan” and “Course Study Plan” based on the needs and characteristics of the students were prepared with the students. Interviews were also held with teachers who were teaching other courses about the students. Parents of the students were provided with a 2-week seminar on educational coaching and students.

In week 3, the “Student Life Circle” was implemented to allow the students to observe the balance/imbalances in their lives and avoid the disruptions they were not aware of. This practice aimed for the students to see their obstacles, set goals, create strategies, and make necessary plans to take action.

Every week: During the educational coaching meetings, “Weekly Life Plan”, “Course Study Plan”, “Subject Gain Deficiency”, and “Number of Solved Questions” were discussed and followed up. Considering the feedback from students, the “Weekly Life Plan” and “Course Study Plan” were updated for each student when necessary.

In week 4, difficulties experienced by the students in their courses were identified using the "Course Circle" and solutions were found. The “Course Topic Circle” was used to determine the issues the students experienced in the subjects of their courses and to produce solutions. “Weekly Life Plan” and “Course Study Plan” prepared with the student in the second week were amended based on the feedback received through “Course Circle” and the “Course Topic Circle”.

In week 5, solutions to the difficulties and problems encountered by the student in complying with the lesson study plan were found using the “Course Study Plan Circle”. Thus, the students’ improvements were closely monitored, and they were allowed to see their deficiencies themselves. The “Weekly Life Plan” and “Course Study Plan” prepared for each student in week 3 were updated based on the information obtained from the “Course Study Plan Circle”.

In week 6, a graphical tool called “Obstacles on the Road to Success” and “Student Success Circle” were developed to identify students’ potential obstacles on their journey to success and determine how they should overcome these obstacles.

In week 7, a “Student Skill Circle” was conducted with the students. In addition, the “Time Stealers and My Time Thieves” study was conducted to raise students’ awareness about how to effectively manage time and eliminate the factors stealing their time. Each parent and other course teachers were individually interviewed regarding the improvement of the students.

In week 8, an investigation was conducted to identify the variables that negatively impact students' motivation and self-efficacy beliefs toward the course and to eliminate these factors. In week 9, "My Stress and Anxiety Sources Circle" was used to determine the factors causing stress and anxiety in students and to eliminate them.

In week 10, the "Stopping Procrastination and Taking Responsibility" study was carried out to examine students' procrastination, laziness, and taking responsibility behaviors, produce solutions for procrastination and laziness behaviors, and to improve taking responsibility behavior.

In week 11, the activities carried out during the 10 weeks of the coaching process were discussed with students. The displacement game was played to enable the students to observe themselves and their behaviors, empathize, and raise awareness about the educational coaching process.

In week 12, students were interviewed about how to cope with game-phone-tablet-computer-social media addiction. The "Effects of Game and Social Media Addiction" form was used for this purpose.

In weeks 13 and 14, the "Student Life Circle" and "Student Success Circle", which were administered in weeks 3 and 6, were readministered by going through each interview. Thus, ensured that the students observed their improvements. Additionally, parents and other course teachers were interviewed regarding the improvements of the students.

The SAT and SMSC were applied to the control-experimental classes as post-tests at the conclusion of the study. In addition, the SAT was readministered 4 weeks after the completion of the study, and the SMSC was readministered 12 weeks later as follow-up tests. The SCAG-II was also collected to evaluate the students' achievement.

Analysis of Data

The investigation's data was examined using the SPSS 22 software. The conclusions of the analysis done to examine the distribution of the data collected from SAT, SMSC and SCAG are displayed in Table 1.

Table 1. Normality Analysis of SAT, SMSC and SCAG Data

Control				Experiment		
	Skewness	Kurtosis	Shapiro W.	Skewness	Kurtosis	Shapiro W.
SAT Pre-test	-0.20	-0.89	0.31	0.30	-0.60	0.42
SAT Posttest	-0.26	-0.43	0.70	-0.50	-0.92	0.10
SAT Follow-up	0.45	-0.86	0.14	0.34	-0.52	0.70
SCAG-I	0.22	-0.80	0.50	-0.04	-0.79	0.67
SCAG-II	0.30	-0.83	0.45	0.14	-0.83	0.76
SMSC Pre-test	0.35	-0.60	0.42	0.27	-0.92	0.37
SMSC Posttest	0.30	-0.55	0.65	-0.12	-0.74	0.57
SMSC Follow-up	0.38	-0.33	0.63	-0.26	-0.89	0.36

Table 1 demonstrates that the skewness-kurtosis coefficients of the SAT, SMSC and SCAG data were ranged from -1.5 to +1.5 and the meaningfulness value of the Shapiro-Wilk test results was > 0.05. These findings showed that the SAT, SMSC and SCAG data were normally distributed (Büyüköztürk, 2016; Kalaycı, 2018).

The control and experimental groups' SAT, SMSC and SCAG points were checked against with the independent groups t-test. The dependent groups t-test was applied to compare the SCAG-I and SCAG-II. The groups' pre-, post-, and follow-up test data were compared using one-factor ANOVA for repeated measures (Büyüköztürk, 2016; Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz & Demirel, 2016; Kalaycı, 2018; Tabachnick & Fidell, 2013). Eta squared (η^2) was calculated in analyses with significant differences. Based on the value ranges, the effect size was interpreted as follows: low if $0.01<\eta^2<0.06$, medium if $0.06\leq\eta^2<0.14$, and high if $0.14\leq\eta^2$ (Cohen, 1988).

Findings

Findings for the SAT

Table 2. Comparison of SAT Points of the Control-Experimental Groups

Test	Group	N	x̄	S	df	t	p	η2
Pre	Control	30	7.10	3.33	58	0.26	0.80	-
	Experiment	30	6.87	3.69				
Post	Control	30	20.03	6.70	58	-3.19	0.002	0.18
	Experiment	30	25.43	6.40				
Follow-up	Control	30	13.80	6.91	58	-4.29	0.001	0.24
	Experiment	30	20.47	4.97				

The differentiation between the SAT points of the control and experimental classes was not meaningful at the start of the investigation ($t_{(58)}=0.26$; $p>.05$). On the other hand, the experimental class had meaningfully greater SAT posttest ($t_{(58)}= -3.19$; $p<.05$) and follow-up test points ($t_{(58)}= -4.29$; $p<.05$) than the control group. Additionally, since the η^2 values calculated for the SAT posttest and SAT follow-up tests were > 0.14, indicating a high effect size (Table 2).

Table 3. Comparison of the SAT pre-, post-, and follow-up test Points of the Control Group

Variance's Source	Square's Sum	df	Square's Mean	F	P	η2	Difference
BetweenSubjects	1271.956	29	43.861				Post-Pre, Follow up-Pre, Post-Follow up
Measurement	2510.156	2	1719.427				
Error	1736.511	58	29.940	41.92	0.001	0.59	
Total	5518.623	89					

There was a meaningful differentiation among the pretest and posttest points of the control class in favor of the posttest, between the pretest and follow-up test scores in favor of the follow-up test, and among the posttest and follow-up test scores in favor of the posttest ($F_{(2-58)}=41.92$; $p<.05$). The η^2 value was > 0.14, which showed a high effect size (Table 3).

Table 4. Comparison of the SAT Pre-, Post-, and Follow-up test Points of the Experimental Group

Variance's Source	Square's Sum	df	Square's Mean	F	P	η2	Difference
BetweenSubjects	733.122	29	25.280				Post-Pre, Follow up-Pre, Post-Follow up
Measurement	5543.489	2	2771.744				
Error	1569.178	58	27.055	102.449	0.001	0.78	
Total	7845.789	89					

There was a meaningful differentiation among the pretest and posttest scores of the experimental class in favor of the posttest, between the pretest and follow-up test scores in favor of the follow-up test, and among the posttest and follow-up test scores in favor of the posttest ($F_{(2-58)}$=102.449; p<.05). Similarly, the η^2 value was > 0.14, showing a high effect size (Table 4).

Findings for Science Course Grade Averages

Table 5. Comparison of SCAG Scores the Control and Experimental Groups

		N	X	S	Df	t	p	η2
SCAG-I	Control	30	60.33	12.94	58	0.09	0.93	-
	Experiment	30	60.03	11.74				
SCAG-II	Control	30	61.50	12.38	58	-3.18	0.002	0.15
	Experiment	30	70.77	10.13				

No meaningful differentiation was found between the control and experimental classes' SCAG-I at the starting of the investigation ($t_{(58)}$= 0.09; p>.05). Nonetheless, the differentiation between the SCAG-II was significant and in favor of the experimental class at the finishing of the investigation ($t_{(58)}$= -3,18; p <,05). In addition, the η^2 value showed a high effect size (Table 5).

Table 6. Comparison of SCAG-I and SCAG-II Scores of the Study Groups

		N	X	S	df	t	p	η2
Control	SCAG-I	30	60.33	12.94	29	-1.08	0.29	-
	SCAG-II	30	61.50	12.38				
Experiment	SCAG-I	30	60.03	11.74	29	-7.44	0.001	0.49
	SCAG-II	30	70.77	10.13				

There was no meaningful differentiation among the control class's SCAG-I and SCAG-II scores ($t_{(29)}$= -1.08; p>.05); however, the differentiation between the experimental group's SCAG-I and SCAG-II scores was significant and in favor of SCAG-II ($t_{(29)}$= -7.44; p<.05). η^2 value showed a high effect size (Table 6).

Findings for Motivation

Table 8. Comparison of SMSC Points of the Control and Experimental Groups

Test	Group	N	$\bar{x}$	S	df	t	p	η2
Pre	Control	30	73.80	12.16	58	0.15	0.88	-
	Experiment	30	73.30	13.81				
Post	Control	30	74.37	13.06	58	-5.45	0.001	0.34
	Experiment	30	92.77	13.08				
Follow-up	Control	30	74.63	14.85	58	-4.89	0.001	0.29
	Experiment	30	92.97	14.17				

There was no meaningful differentiation among the pretest points of the control and experimental classes ($t_{(58)}$=0.15; p>.05). However, the posttest ($t_{(58)}$= -5.45; p<.05) and follow-up test points ($t_{(58)}$= -4.89; p<.05) of the experimental class were meaningfully greater than the class under control. The η^2 values of the posttest and follow-up test of the SMSC were > 0.14, which indicated a high effect size.

Table 9. Comparison of the SMSC Pre-, Post-, and Follow-up Test Points of the Control Group

Variance's Source	Square's Sum	df	Square's Mean	F	p
BetweenSubjects	15014.933	29	517.756		
Measurement	10.867	2	5.433	0.507	0.605
Error	621.800	58	10.721		
Total	15647.6	89			

No significant differences ($F_{(2-58)}$= 0.507; p>.05) were found among the pre-, post-, and follow-up test points of the group under control (Table 9).

Table 10. Comparison of the SMSC Pre-, Post-, and Follow-up Test Points of the Experimental Group

Variance's Source	Square's Sum	df	Square's Mean	F	p	η2	Difference
BetweenSubjects	13692.989	29	472.172				Post-Pre,
Measurement	7657.689	2	3828.844	84.708	0.001	0.75	
Error	2621.644	58	45.201				Follow up-Pre
Total	23972.32	89					

There was a meaningful differentiation among the pretest and posttest points of the experimental group in favor of the posttest and among the pretest and follow-up test points of the experimental class in favor of the follow-up test ($F_{(2-58)}$= 84.708; p<.05). The η^2 value was > 0.14, showing a high effect size (Table 10).

Discussion

Achievement in Science Course

The SAT and SCAG-I pretest points of the control and experimental classes were similar at the initial stage of the investigation. However, the SAT points of the experimental class were meaningfully greater than those of the control class at the finishing of the study and four weeks after the study. Similarly, the experimental class's SCAG-II points were meaningfully greater than those of the control class at the finishing of the study. Besides, the impact size was also high. These findings can be comprehended as evidence of the positive effect of educational coaching on science lesson accomplishment in the experimental class.

The SAT points of the control class rose meaningfully at the finishing of the study compared to the beginning of the study; however, this increase could not be maintained after 4 weeks. This can be attributed to the fact that achievement is a cognitive feature that can change in a short time. No meaningful increase was determined in the SCAG points of the control class during the study process. It contradictory that the control group's SAT points meaningfully raised during the course of the study, while their SCAG scores did not. This contrast can be explained as follows: The increase in the SAT scores of the control class was related to the fact that they were taught the topics in the SAT for the first time and that the researcher provided student-centered instruction. The reality that there was no meaningful improvement in the control class's SCAG scores can be explained by the fact that the scope of the 7th class science lesson content in the first and second semesters were different, they were taught the subjects for the first time, the SCAG scores of the students consisted of science course first and second written exam and performance grades, and the students' performance and written grades in the first and second semesters were similar.

The experimental class's SAT and SCAG scores increased significantly. This can be because the pupils in this class were instructed on the topics in the SAT for the first time, received student-centered teaching from the researcher, or the positive effect of educational coaching on science course achievement. Both groups' SAT and SCAG scores were similar at the start of the investigation;

however, at the finish of the investigation, the SAT and SCAG points of the experimental class were meaningfully bigger than those of the class under control. Likewise, both groups were provided with the same student-centered teaching processes by the same researcher, and the students were taught the topics in the SAT for the first time. Unlike the control class, the experimental class received educational coaching. Considering this situation, the meaningful rise in the experimental class's SAT and SCAG points could be due to the educational coaching activities, which was the experimental process. This can also be more broadly attributed to the "Student Success Circle" and "Obstacles on the Journey to Success" used to determine the variables impacting the pupil's success, the "Course Study Plan Circle" used to determine the variables impacting the pupil's study plan, the "Course Subject Circle" used to determine the subject-gain deficiencies in science courses, and the "Weekly Life Plan" and "Course Study Plan" used to check that the pupils studied in a planned and organized manner. In addition, the outcomes of the study can be explained by determining students' learning styles and multiple intelligence areas using the "Learning Styles Scale" and "Multiple Intelligences Assessment Inventory" and preparing and following the "Student Goal and Action Plan" about effective learning and learning strategies. In week 8 of the educational coaching, "My Sources of Stress and Anxiety Form" was used to determine the factors that lead to stress and anxiety toward the course and exams, and to eliminate the effects of these factors. Given that stress and anxiety are two factors that have a negative effect on success, this activity might have contributed to an increase in achievement. The literature includes investigations that back up the conclusion of this investigation. For example, Karabacak (2013), Çatalbaş (2016), Yüksel (2017), Kalçık (2018), Bulut (2019), Taşkın (2019) and Aydoğdu (2022) found that student coaching significantly contributed to success in the course. Akdağ (2024), Fidan (2018) reported that coaching practices contributed to learning. Ceylan (2011), Duman (2013), and Tümen Akyıldız (2015) found that cognitive coaching contributed to success. Çam Tosun and Bayram (2017) concluded that student coaching contributed to success according to teacher and student opinions. The results of the studies conducted by Bjerken (2013), Brunner, Artelt and Krauss (2007), Chaplin (2007), Combs (2015), Davis (2020), Dedeche (2019), Oreopoulos and Petronijevic (2018), Robinson and Gahagan (2010), Rinaldi (2013) and Singley (2017) also support the results found in the current investigation. Wolff et al. (2020) and Howlett et al. (2021) reported that student coaching practices contributed to learning goals and metacognitive awareness levels, respectively. All the investigation conclusions above demonstrate that coaching practices have a beneficial effect on achievement. Similarly, the present investigation determined that educational coaching had a beneficial influence on achievement. However, this study differs from the above studies in several ways. First, in this study, educational coaching was conducted over an entire academic semester. Second, the study was based on one of the coaching models (GROW). Third, the goal action plan and the target action plan were evaluated in the weekly interviews and the students were helped to find their strategies in accordance with the philosophy of educational coaching. Fourth, the forms developed for educational coaching were used effectively. Fifth, the effect of educational coaching on science achievement was determined using SAT and SCAG scores. Finally, the persistence of achievement was monitored.

Motivation Toward Science Course

The study groups' motivation levels in science lessons were similar before the beginning of the investigation. However, the motivation levels of the pupils in the experimental class increased meaningfully at the finishing of the investigation. This significant rise may have resulted from student-centered teaching, the science teacher, or the educational coaching practices applied as an experimental procedure. Finishing of the investigation and 12 weeks after the investigation was finished, the motivation points of the pupils in the class under experimentation were meaningfully bigger than those of the pupils in the class under control. Students in both groups were taught science by the same researcher who practiced student-centered science teaching. The different variable here was the educational coaching practices used as an experimental procedure in the experimental group. Considering all these, it can be concluded that the significant increase in the motivation level of the experimental class was not due to student-centered teaching or the science teacher, that is, the researcher's effect but to the educational coaching activities implemented as an experimental process during which the factors that negatively affected students' motivation and their self-efficacy beliefs

toward the course were identified and attempted to eliminate. For this purpose, a "Student Goal and Action Plan" was prepared, implemented, and followed up every week with the "Student Goal and Action Plan Evaluation", which may explain the result of the investigation. No meaningful change was seen in the control class's motivation scores. This could have resulted from the fact that the same science teaching processes were applied by the same science instructor in both the first and second semesters in the control class. An examination of the literature demonstrated that there were very few studies examining the effect of educational coaching on motivation. Sezer (2016) found that educational coaching increased academic motivation, a result that supports the result reached in this study. Sezer's (2016) study differs from this study in that it covered a period of 6 weeks, and student-centered teaching was given to the experimental class while traditional teaching was given to the control class. This leads to the question of whether the improvement in academic motivation was caused by student-centered instruction or educational coaching. To avoid this question and examine the effect of educational coaching in this study, student-centered instruction was applied in both study groups.

Conclusions

This study found that educational coaching, which was uniquely designed with the GROW model, contributed meaningfully to the growth and maintenance of motivation and achievement levels in science lessons. The primary cause for the conclusion can be due to the educational coaching activities carried out for 20 minutes outside the lesson every week. Educational coaching activities performed in the study contributed to students getting to know themselves, seeing their strengths, weaknesses, and deficiencies, strengthening their weaknesses, revealing their potential, completing their cognitive deficiencies, and increasing their learning motivation and self-confidence.

Recommendations

When taking into consideration the positive influence of educational coaching on motivation and achievement, educational coaching should be included in education. Considering the positive effect of educational coaching on motivation and success, educational coaching must be involved in education.

Policy Implications

The results of this investigation provide evidence that educational coaching, uniquely designed with the GROW model, contributes positively to the development of achievement and motivation. With educational coaching activities, students can get to know themselves, see their strengths, weaknesses, and deficiencies, strengthen their weaknesses, reveal their potential, complete their cognitive deficiencies, and increase their learning motivation and self-confidence. In addition, students' interests, readiness, learning styles, and comprehension levels ought to be taken into account, and teaching should be carried out with appropriate learning-teaching processes. With educational coaching, it is possible to reach all students in the classroom, to recognize students, to support students in their education, to equalize opportunities and conditions in the education, to provide ease of learning for pupils, and to develop positive attitudes-motivation regarding the course. In this study, the above-mentioned activities were carried out with educational coaching and the development of each student's learning, and motivation was contributed. Thus, learning opportunities and conditions were equalized for each student.

The educational coaching, which is uniquely designed with the GROW model presented in this study, constitutes a concrete example of educational coaching practice for teachers, pre-service teachers, and researchers. The educational coaching forms developed by the researchers in this study will also help to the implementation of educational coaching activities and the achievement of educational coaching goals. In addition, the educational coaching developed in this study can be taken as a model by educators and educational policymakers, and educational coaching practices can be expanded in schools. In this way, the widespread implementation of educational coaching practices in

schools can contribute to the development of the success and motivation of each student and equality of opportunity in education.

Conflicts of Interest: No conflict of interest has been declared by the authors.

Funding Details: This study was not funded by any organization.

Ethical Statement: The ethical approval was obtained from the Gazi University Academic Ethics Committee, as documented with the decision numbered 2024-443 and dated 12.03.2024 to conduct the research and gather data.

Credit Author Statement: Each author made an equal contribution to the study.

References

Akdağ, B. (2024). *The effect of coaching service on students' growth mindsets, academic self-concepts, and achievements.* Master's thesis, Necmettin Erbakan University Institute of Educational Sciences, Konya.

Atasayar, M., Bilgin O., & Güler N. (2010, Mart). *The effect of academic coaching (student coaching) system applied in primary schools on students' self-adjustment levels.* Paper presented at the 12th Arel Educational Institutions Guidance Symposium, Arel Educational Institutions, Istanbul.

Aydoğdu, A. (2022). *The effect of hybrid coaching supported teaching on students' academic achievement in 5th grade mathematics course.* Master's thesis, Bartın University Graduate Education Institute, Bartın.

Bjerken, K. S. (2013). *Building self-directed teachers: A Case study of teachers' perspectives of the effects of cognitive coaching on professional practices.* Doctoral Dissertation, Minnesota State University, Minnesota.

Brunner, M., Artelt, C., Krauss, S., & Baumert, J. (2007). Coaching for the PISA test. *Learning and Instruction, 17*(2), 111-122

Bulut, A. S. (2019). *The impact of student coaching on middle school students' achievement in and attitudes toward mathematics.* Master's thesis, Kırşehir Ahi Evran University Institute of Social Sciences, Kırşehir.

Büyüköztürk, Ş. (2016). *Handbook of data analysis for the social sciences.* Ankara: Pegem.

Büyüköztürk, S., Kılıç Çakmak E., Akgün, O. E., Karadeniz, S., & Demirel, F. (2016). *Scientific research methods.* Ankara: Pegem.

Çam Tosun, F., & Bayram, A. (2017). Teacher and student perceptions of student coaching: Bayburt example. *Pen International Journal of Educational and Human Sciences, 7*(1), 1-18.

Can, B. (2023). Academic coaching as a solution tool to the problems of the graduate processes in Turkish Academy. *Journal of University Research, 6*(1), 60-77. https://doi.org/10.32329/uad.993658

Çatalbaş, E. (2016). *The effects of educational coaching in success of eighth grade students.* Master's thesis, İstanbul Aydın University Institute of Social Sciences, İstanbul.

Ceylan, M. (2011). *Studying effects of metacognitive strategy thought with cognitive coaching path on students' achievements, their metacognitive skills, and attitude.* Master's thesis, Atatürk University Institute of Educational Sciences, Erzurum.

Chaplin, S. (2007). A model of student success: Coaching students to develop critical thinking skills in introductory biology courses. *International Journal for the scholarship of teaching and learning, 1*(2), 10.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* New Jersey: Lawrence Erlbaum Associates.

Combs, W. A. (2015). *Academic coaching practices for students with learning disabilities and differences.* Doctoral Dissertation, University of Southern California, California.

Davis, L. M. (2020). *Academic coaching as part of response to intervention.* Doctoral Dissertation, The University of Findlay, College of Education, Ohio.

Dede, Y., & Yaman, S. (2008). A questionnaire for motivation toward science learning: A validity and reliability study. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education, 2*(1), 19-37.

Dedeche, A. (2019). *Impact of life-coaching on students' wellbeing and engagement levels in a preparatory school in Qatar.* Master's Thesis, Hamad Bin Khalifa University, Ar-Rayyan.

Demir, Ö. (2009). *The effect of metacognitive strategies instructed through cognitive coaching on students? epistemological beliefs, metacognitive skills, academic achievement and the retention of these in 6th grade social studies course.* Doctoral dissertation, Çukurova University Institute of Social Sciences, Adana.

Demir, Ö., & Doğanay, A. (2009). Cognitive coaching approach in developing metacognitive skills. *Educational Administration: Theory and Practice, 15*(60), 601-623.

Duman, A. O. (2013). *The effect of cognitive cooaching on academic achivement and democratic attitutes in 7th grade social studies lesson.* Niğde Ömer Halis Demir University Institute of Educational Sciences, Niğde.

Fidan, A. (2018). *The effects of hybrid coaching on teaching behaviors of middle school teachers and academic outcomes of their students with disabilities in general education settings.* Anadolu University Institute of Educational Sciences, Eskişehir.

Grant, A. M. & Greene, J. (2001). *Coach yourself: Make real change in your life.* London: Momentum.

Grant, A. M. (2011). Is it time to REGROW the GROW model? Issues related to teaching coaching session structures. *The Coaching Psychologist, 7*(2), 118-126.

Hawkins, L. (2003). Solutions coaching? No problem. *Industrial and Commercial Training, 35*(7), 285-289.

Howlett, M. A., McWilliams, M. A., Rademacher, K., O'Neill, J. C., Maitland, T. L., Abels, K.,…Panter, A. T. (2021). Investigating the effects of academic coaching on college students' metacognition. *Innovative Higher Education, 46,* 189-204. https://doi.org/10.1007/s10755-020-09533-7

Jenkins, S. (2009). The impact of the inner game and Sir John Whitmore on coaching. *Annual Review of High Performance Coaching and Consulting*, 1, 1-22.

Kalaycı, Ş. (2018). *Multivariate statistical techniques with SPSS applications.* Ankara: Asil.

Kalçık, F. (2017). A way to support student achievement: Student coaching. *Bartın University Journal of Educational Research, 1*(1), 53-67.

Kalçık, F. (2018). *The effect of quantum learning approach supported by coaching on the academic achievement and attitudes of students in science course.* Master's thesis, Bartın University Institute of Educational Sciences, Bartın.

Karabacak, K. (2010). *Educational dilemmas caused by SBS.* Doctoral dissertation, Abant İzzet Baysal University Institute of Social Sciences, Bolu.

Karabacak, K. (2013). The effect of academic coaching on students' academic performances. *Sakarya University Journal of Education Faculty,* (20), 81-94.

Karasar, N. (2016). *Scientific research method: Concepts, principles, techniques*. Ankara: Nobel.

Köktürk, M. (2006). *Coaching and mentoring with real stories*. İstanbul: Morpa Kültür.

Kulaç T. (2002). The role of the coaching in career development. Master's thesis. Marmara University Institute of Social Sciences. İstanbul:

Landsberg, M. (1999). *The tao of coaching* (H. B. Çelik, Trans.). İstanbul: Sistem.

Ministry of National Education. (2019). *Edirne Student coaching project: Handbook.* Retrieved from http://edirne.meb.gov.tr/ogrenci_koclugu_projesi.pdf

Oreopoulos, P. & Petronijevic, U. (2018). Student coaching: How far can technology go? *Journal of Human Resources, 53*(2), 299-329.

Öz, İ. (2013). *Student coaching.* İstanbul: C Planı.

Özbay, Ö. (2008). *The effects of the coaching approach on managers and a research.* Master's thesis, Pamukkale University Institute of Social Sciences, Denizli.

Pınar, A. H. (2013). A study on the relationship between primary school class teachers' coaching and mentoring competencies and students' exam success scores in terms of Mintzberg's management approach. Journal of Çukurova University Institute of Social Sciences*, 22*(1), 121-138.

Richman, E. L., Rademacher, K. N. & Maitland, T. L. (2014). Coaching and college success. *Journal of Postsecondary Education and Disability, 27*(1), 33-52.

Rinaldi, L. (2013). *The effects of learning about the five states of mind on elementary children in grades 3, 4, and 5.* Doctoral Dissertation, Fielding Graduate University, Santa Barbara.

Robinson, C. & Gahagan, J. (2010). In practice: Coaching students to academic success and engagement on campus. *About Campus, 15*(4), 26-29.

Sezer, Ş. (2016). The effects of educational coaching on students' academic motivation, error oriented motivation and educational stress. *The Turkish Online Journal of Educational Technology, 7,* 850-855.

Singley, D. M. (2017). *Effects of academic coaching on college students with learning disabilities.* Doctoral Dissertation, Lehigh University, Pensilvanya.

Spence, G. B., & Grant, A. M. (2007). Professional and peer life coaching and the enhancement of goal striving and well-being: An exploratory study. *The Journal of Positive Psychology, 2*(3), 185-194.

Starr, J. (2004). The manager's role in coaching overcoming barriers to success. *Development and Learning in Organizations, 18*(2), 9-12.

Tabachnick, B. G. & Fidell, L. S. (2013). *Using multivariate statistics.* Boston: Allyn and Bacon.

Taşkın, A. (2019). *The effect of the student coaching to the academic achievements and affective field attitudes of primary 4th grade students in the course of English.* Master's thesis, Muğla Sıtkı Koçman University Institute of Educational Sciences, Muğla.

Tümen Akyıldız, S. (2019). A new approach for the students of 21st century: Cognitive coaching. *Turkish Studies, 14*(7), 4031-4057. https://doi.org/10.29228/TurkishStudies.36883

Turhan, B. (2022). *The effect of cognitive coaching approach on cognitive flexibility and problem solving skills of teachers.* Çağ University Institute of Social Sciences, Mersin.

Vardarlıer, P. & Özsürünç, R. (2019). Application of GROW model in coaching education. *Karadeniz Technical University Institute of Social Sciences Journal of Social Sciences, 9*(17), 145-163.

Whitmore, J. (2005). *Coaching for performance*. Londra: Growing People.

Wolff, M., Stojan, J., Buckler, S., Cranford, J., Whitman, L., Gruppen, L. & Santen, S. (2020). Coaching to improve self-directed learning. *The Clinical Teacher, 17,* 408- 412. https://doi.org/10.1111/tct.13109

Yazır Özgür, P. (2015). *Student coaching.* İstanbul: Bab-ı Saadet.

Yüksel, G. (2017). *The effect of using coaching method in teaching word processing programme on secondary school students' education*. Master's thesis, Afyon Kocatepe University Institute of Science, Afyon.

The Effect of an Intelligence Games Course on Sixth Grade Students' Mathematical Reasoning Abilities*

Aslıhan Ata Özer**
Ministry of National Education (Türkiye)

Ayten Pınar Bal***
Cukurova University (Türkiye)

Abstract

The aim of this research is to examine the effectiveness of intelligence games (IG) on mathematical reasoning abilities (MRA) and mathematics achievement scores of students. For this purpose, mathematical reasoning pre-test was given to three groups of 6th grade middle school students, and then, after the experimental group was given a training program that included all the contents of the IG course curriculum, a mathematical reasoning post-test administered in all groups. The data obtained were evaluated with SPSS 25 package program, ANOVA and ANCOVA analyses. According to the analysis, since the difference between the groups' mathematical reasoning pre-test scores was statistically meaningful, the post-test results were evaluated with ANCOVA. According to the results of the evaluation of the post-test points of the participants, the difference between the experimental group and the control 2 group was found to be statistically significant and this was interpreted as a positive development in the MRA of the students who received IG training. While there found not any significant differences between the MRA posttest points of the groups participating in the study and their genders, a significant difference was found between their math course achievement grades. This was interpreted as a meaningful affect in the math course grades the students who received IG training. Based on the study, it can be suggested that due to the important influence of IG on MRA, it may be useful to integrate them into the activities in mathematics courses conducted at school.

Keywords: Reasoning, Mathematical Reasoning, Intelligence Games.

** ***Dr. Aslıhan Ata Özer***, Ministry of National Education, ORCID ID: 0000-0002-7227-6490
e-mail: aslata05@gmail.com

*** ***Prof. Dr. Ayten Pınar Bal***, Cukurova University, Faculty of Education, Department of Elementary Education, ORCID ID: 0000-0003-1695-9876 e-mail: apinar@cu.edu.tr

Correspondence: aslata05@gmail.com

* A part of this study was submitted to the XVI. International Congress of Educational Research in 2023 and included in the summary textbook.

Introduction

In a developing and changing world, the competencies expected from individuals have also changed. Higher level competencies such as problem solving, reasoning, critical and creative thinking have gained importance. In this context, the basic aims of education have been revised. Considering these high-level abilities expected from individuals, it is actually possible to see the main purpose of mathematics education. Because mathematics education aims to develop abilities such as establishing cause and effect relationships, analysis, problem solving, prediction, creative thinking, and reasoning (Milli Eğitim Bakanlığı, 2005).

Recent developments have required learning environments to go beyond being uniform. With the constructivist approach, in which learners create information based on their past experiences (Airasian & Walsh, 1997), learning environments in which students are centered and their needs are taken into account to develop their thinking abilities have gained importance. In this way, the approach of trying to bring individuals with different characteristics, experiences and experiences to the same goals has been moved away (Koç & Demirel, 2004). In this direction, the Ministry of National Education wanted new generations to be able to not only know mathematics, but also to be able to apply what they know, solve problems and make reasoning with the new programs implemented in 2005 (MEB, 2005). In these changes, revisions were made frequently and MEB (2015) defined reasoning as a mathematical skill that students should acquire in the 5th, 6th, 7th and 8th grade curricula. Reasoning is defined as the use of available data to make decisions and reach conclusions (Nickerson, 2004). Mathematical reasoning, on the other hand, is defined as the process of obtaining new results by using mathematical tools and thinking techniques based on the data of the individual's past experiences (MEB,2013).

Mathematical reasoning is based on the individual's past experiences and thinking techniques. A review of the literature reveals that there are different classifications ofmathematical reasoning. Inductive and deductive reasoning, which are mostly considered as thinking techniques, are also described as complementary roles in mathematical reasoning (Simon, 1996). NCTM principles classify reasoning as algebraic, geometric, probabilistic and statistical based on subject matter (Lithner, 2005). Akkuş Çıkla and Duatepe (2002) categorized reasoning into three groups: algebraic, proportional, geometric and statistical based on subject matter; analytical and holistic based on perspective; and practical and abstract based on thinking style. In algebraic reasoning, predictions and assumptions are made in algebraic subjects, in proportional reasoning, in addition to the ability to perform operations, simultaneous changes and comparisons are made, while in geometric reasoning, assumptions are made about the properties of two or more dimensional objects and their location, direction and transformations (Aydoğan Yenmez & Gökçe, 2022, p.16). Statistical reasoning involves making sense of and interpreting statistical data. According to the point of view, in mathematical reasoning, the parts are examined separately in the analytic approach, while the holistic approach deals with the whole, not the parts. While abstract reasoning involves theoretical knowledge, practical reasoning involves transfer to daily life (Umay, 2003).

Lithner (2008), who has conducted long-term studies on the process of mathematical reasoning, classified the process into two groups: analogy-based and creativity-based. He categorized analogy-based mathematical reasoning as rote-based and algorithm-based. In Lithner's (2008) classification, while analogy-based mathematical reasoning involves the maintenance of a procedure, creativity-based reasoning involves in-depth reasoning. Student can use one of these types of reasoning for a situation or they can use several of them at the same time.

Kiili (2007) reveals in his study that reasoning abilities can be developed in individuals with games at an early age. In this case, it can be said that one of the importantways to create different learning environments for students, support their reasoning and enable them to develop different strategies is IG (Dicle, 2019). With IG, individuals have the opportunity to develop higher level abilities such as creative, critical and reflective thinking, decision making and problem solving. With IG, individuals find the opportunity to develop high-level abilities such as creative thinking, critical

thinking, reflective thinking, decision making, and problem solving (Demirel, 2015). At this point, based on the idea that IG can be a good tool for students to raise their cognitive competence, problem solving and thinking abilities to higher levels through games and activities, MEB (2013) decided to teach them as an elective course in secondary schools as of the 2012-2013 academic year. In this framework, MEB (2013) categorized IG as shown in Table 1.

Table 1. *Classification of IG*

Game Type	Examples
Reasoning and processing games	Sudoku, action square, kendoku, apartment
Verbal games	Anagrams, cipher games, word hunt
Geometrik-mechanical games	Tangram, soma cube, katamino
Memory games	Matching, picture matching
Strategy games	Reversi, mangala, abolone
Intelligence questions	

With the inclusion of the concept of reasoning in the mathematics curriculum and the studies conducted abroad, the importance of MRA has been clearly demonstrated. On this basis, a number of studies have been conducted on MRA. Regarding IG (in some studies), the opinions of teachers and prospective teachers on IG were included (Adalar & Yüksel, 2017; Alkaş Ulusoy, Saygı & Umay, 2017; Saygı & Alkaş Ulusoy, 2019). There are also studies that reveal students' spatial abilities, problem solving abilities, problem solving strategies andreasoning abilities (Demirkaya & Masal, 2017; Dokumacı Sütçü, 2017; Kurbal, 2015).

Yöndemli and Taş (2018) conducted a study to reveal the efficacy of IG on the MRA of middle school students. When examined from the studies, in addition to the studies on teachers and prospective teachers, there are studies in which students' mathematical abilities are measured according to a selected subject area. In addition to these, it was observed that there was no study in which all the contents of the IG course were applied and the effect of this on participants' MRA was explained. Based on this deficiency, this study aims to contribute to the literature.

With this study, it was aimed to explain whether a training program that includes all of the games in the curriculum of the elective IG course has an effect on the MRA of 6th grade middle school students. Therefore, responses were sought to the following research problems;

1. Is there a statistically meaningful difference between the mathematical reasoning scale pre-test scores of the experimental group and the control group who received IG training?

2. Is there a statistically meaningful difference between the post-test scores of the mathematical reasoning scale of the experimental group and the control group who received IG training?

3. Is there a statistically meaningful difference between the post-test scores of the students in the experimental and control groups from the mathematical reasoning scale and their gender?

4. Is there a statistically meaningful difference between the post-test scores of the students in the experimental and control groups from the mathematical reasoning scale and their end-of-year mathematics course grades?

Methods

In this study, the efficacy of the application made within the scope of the IG course on the MRA of 6th grade middle school students was tested. The study was conducted using quantitative and experimental research method. Because with experimental research, the procedures performed can be compared, their effects can be examined and the results can lead the researcher to more precise conclusions (Büyüköztürk et al., 2009, p.13).

Study Model

The study was designed as a quasi-experimental design with a pre-test and a post-test control group. In the pretest-posttest design with control group, the unbiased assignment of the independent variable to the groups strengthens the design (Gliner et al., 2015, p.60). It had one experimental and two control arms. In the study, the implementation of IG content was determined as the independent variable, and the level of mathematical reasoning, gender, and mathematics course achievement grade were determined as the dependent variables. Table 2 below shows the quasi-experimental design of the study.

Table 2. *A Quasi-Experimental Design with Pre-test & Post-test Control Group*

Groups	Pre test	Experimental Procedure	Post test
Experimental Group	X	IG	X
Control Group 1	X	0	X
Control Group 2	X	0	X
IG (Intelligence Games)			

Study Group

The sample of the study includes 6th grade students who attend a secondary school in the central district of Niğde province in the 2022-2023 academic year. Convenience samplingwas used to select the study sample. The reason for choosing this sampling method is that the current situation is accessible, fast and provides convenience to the researcher (Gliner et al., 2015, p.125). One experimental group was randomly chosen from the school's 6th grade classes, one experimental group was randomly chosen from those who had taken an IG course, and two control groups were randomly chosen from the other classes. Table 3 below shows the distribution of the classes and students.

Table 3. *Distribution of Students in the Research Group*

Class	Group	Female	Male	Total
6A	Control Group 1	9	17	26
6B	Control Group 2	10	13	23
6D	Experimental Group	15	8	23

Looking at Table 3, we can see that the number of students in all classes is close to each other. All participant in the classes were entered into the study and there were no missing data.

Data Collection Tools

In order to measure students' MRA, the "Mathematical Reasoning Assessment Scale" was used in the pretest and posttest applications. The scale was developed by Çoban (2019) and includes 11 multiple-choice and 12 short-answer open-ended questions. While the first part of the scale consists of multiple-choice questions, it contains enough questions that can measure the sub-dimensions of MRA to ensure content validity. In the second part, which consists of open-ended questions, it was allowed to express how mathematical reasoning is used (Çoban, 2019). The items of the scale were analyzed and the K20 reliability coefficientwas found to be 0.81. This result shows that the data to be obtained from the scale will be well reliable.

When the scale was evaluated, the correct answers to the multiple-choice questions in the first section were given 1 point and the incorrect answers were given 0 point. Open-ended questions were evaluated with the "Progressive Scoring Scale" developed by Marzano (2000).

The validity and reliability of this scale was demonstrated by Pilten (2008). According to the Progressive Scoring Scale, open-ended questions were scored as follows:

• 0 points; the student did not make any judgment.

• 1 point; the student gave an incorrect answer, but was partially correct in his/her reasoning.

• 2 points; the student gave an incorrect answer, but was able to partially demonstrate the solution process, and although he/she was able to identify the correct reasoning, he/she could not complete it.

• 3 points; the student could not explain why his/her answer was correct and could not fully describe the logic of the generalization.

• 4 points; The student was able to completely explain the procedure and the correctness of the right solution and was able to completely express the logic of the generalization.

While the students' responses were evaluated according to the Progressive Scoring Scale, the Mathematical Reasoning Scale pre-test and post-test were evaluated by two different field experts and the reliability of the evaluation was ensured by finding 94% agreement percentage with the inter-rater percentage agreement method. The sum of the scores obtained from the first and second sections of the scale was used as Mathematical Reasoning pretest and posttest scores.

Data Collection Process

In the initial phase of the research, the Mathematical Reasoning Scale was administered to experimental and control students. Then, the experimental group was taught and played at least one game from all game types in line with the study plan prepared in accordance with the IG curriculum. Before the implementation, the study plan was examined by two field experts and an academician and found appropriate. Table 4 below shows the study schedule prepared.

Table 4. *Working Schedule*

Week 1	Lesson 1	Sudoku teaching.
	Lesson 2	Sudoku solution.
Week 2	Lesson 1	Sudoku solution.
	Lesson 2	Intelligence questions solution.
Week 3	Lesson 1	Anagrams teaching.
	Lesson 2	Anagrams solution.
Week 4	Lesson 1	Tangram teaching.
	Lesson 2	Tangram solution.
Week 5	Lesson 1	Tangram solution
	Lesson 2	Intelligence questions solution..
Week 6	Lesson 1	Picture matching.
	Lesson 2	Picture matching.
Week 7	Lesson 1	Reverse teaching.
	Lesson 2	Reverse playing.
Week 8	Lesson 1	Mangala teaching.
	Lesson 2	Mangala playing.

Within the framework of the plan shown in Table 4, these games were played by the researcher for 2 class hours each week and the participation of the students was ensured. The games and types of games applied to the students are given below; (1) Sudoku, (2) Anagrams, (3) Tangram, (4) Picture Matching, (5) Reversi and Mangala, (6) Intelligence Ouestions.

In line with the prepared work schedule, introductory cards, game instructions and worksheets were prepared for each game. Figures 1, 2 and 3 below show some of the introductory cards, instructions and worksheets for the tangram game.

Figure 1. Tangram Introduction Card

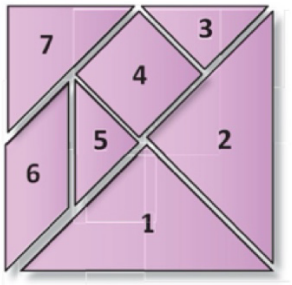
TANGRAM

A simple tangram consists of 7 pieces. Tangram pieces can be used to create geometric shapes, objects, human or animal figures, alphabetic letters or numbers.

Objective: To try to create the given shape using all 7 pieces in the tangram.

Rules:

- The desired shape is achieved with the fewest moves and in the shortest time.



When Figure 1 is examined, the students were initially given a 7-piece tangram and given the necessary information about the game.

Figure 2. Tangram Instruction Sheet

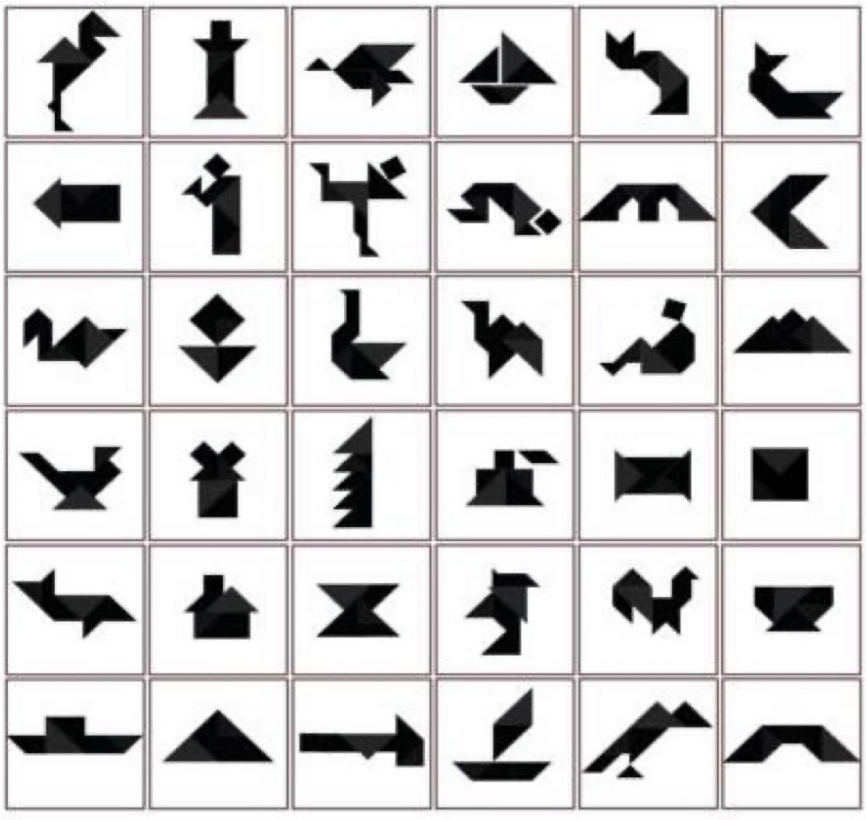
TANGRAM INSTRUCTIONS

1) Divide the students into groups.
2) Give each group a tangram.
3) First of all, make sure that the pieces of the tangrams you use are colored.
4) Ask the students to examine the tangram pieces.
5) Ask the students, do any two pieces in the shape of a triangular region combine to form a quadrilateral region? Can some of the pieces be put together to form a rectangular region? How many different models of polygonal regions are there? Ask questions that will encourage them to think.
6) Then ask them to do it using a dog figure.

7) Divide the class into groups. Open a tangram shape on the board. Check the groups as they work.

Looking at Figure 2, steps are given to guide the practitioner while playing the tangram game.

Figure 3. Tangram Worksheet



The visuals in Figure 3 were presented to the students one by one and they were expected to form the shapes. Then, they were shown the colored versions of the same pictures and were asked to compare their answers.

Data Analysis

The data obtained from the mathematical reasoning scale used in the research were processed using the SPSS 25 software. No data with missing values were found during the analysis process. Then, it was controlled if the pretest and posttest scores in the experimental and control groups showed normality or not. Levene's test was also performed for the homogeneity assumption. As a result of the analysis, the normality of the variances was determined as S<1.5 with the Skewness-Kurtosis test. According to the test result, a value between -1.5 and +1.5 is seen as evidence of a normal distribution (Tabachnick & Fidell, 2013).

• One-way ANOVA, one of the parametric tests, was applied to explain whether the pretest scores on the mathematical reasoning scale showed a statistically meaningfuldifference according to groups since the conditions were met. One way ANOVA is preferred in intergroup measurements where an independent variable with two or more levels is used (Gliner et al., 2015, p.292).

• ANCOVA was used to examine whether there was a statistically meaningful difference in posttest scores on the mathematical reasoning scale by group. In this way, it was aimed to keep the pretest scores under control. In the analysis of covariance, the posttest scores are adjusted for the differences in the groups' pretest scores, making the posttest scores a single variable (Gliner et al., 2015, p.328). The logic here is that there may be differences between the groups even if there is no bias before the experimental application. In addition, Bonferroni technique was used in order to reveal pairwise comparisons while applying ANCOVA.

• One Way ANOVA was conducted to explain the statistical relationship between students' gender and mathematical reasoning scale posttest scores. As a result of the. analysis performed to meet the prerequisites, it was seen that the variances were homogeneous (F=.88, p>.05) and normally distributed.

• One Way ANOVA was conducted to explain the statistical relationship between students' end-of-year mathematics course achievement grades and mathematical reasoning scale posttest scores. As a result of the analysis performed to meet the prerequisites, it was seen that the variances were homogeneous (F=1.516, p>.05) and normally distributed.

Findings

This chapter presents the findings of the research questions by analyzing the data obtained from the mathematical reasoning scale.

Findings Regarding the First Sub-Problem

The pre-test scores of the students in the experimental group and the Control 1 and Control 2 groups were determined with the mathematical reasoning scale before the educational program prepared within the scope of the IG course was implemented. One-way ANOVA was applied to analyze the data to see if there were any statistically meaningful differences between the pretest scores.

From the descriptive analysis, the highest mean (X=16.65; SD=6.29) belongs to the experiment group. The lowest mean (X=11,86; SD=5,37) belongs to the Control 2 group. The mean of the Control 1 group (X =12,76; SD=5,37) is the second highest mean. As a result, the data were analyzed with One Way ANOVA. Analysis results are as in table 5;

Table 5. *Adjusted Means of the Groups' Posttest Scores*

Groups	N	Mean	Adjusted Mean
Exprimental Group	23	20,00	18,01
Control Group1	26	13,69	14,34
Control Group 2	23	10,13	11,38
Total	**72**		

Table 5 indicates that a statistically meaningful difference existed between the pretest scores of the experimental group and the Control 1 and Control 2 groups (F=3,484; p=0.036<0.05). Post hoc analysis was performed to determine the cause of the differentresults, and it was found to be in favor of the experimental group. Posttest scores were analyzed using ANCOVA to determine the effect of this statistically meaningful difference in pretest scores on posttest scores after the experimental study.

Findings Related to the Second Sub-Problem

Posttest means of the Mathematical Reasoning Scale for experimental, control 1, and control 2 groups and adjusted group means as a result of ANCOVA analysis are shown in Table 6:

Table 6. *Adjusted Means of the Groups' Posttest Scores*

Groups	N	Mean	Adjusted Mean
Exprimental Group	23	20,00	18,01
Control Group1	26	13,69	14,34
Control Group 2	23	10,13	11,38
Total	**72**		

When analyzing the sixth table, the normal averages of the experimental groups were 20,00 and the adjusted averages were 18,01. Whereas the normal averages for group 1 were 13.69, the adjusted averages were 14.34, and whereas the normal averages for group 2 were 10.13, the adjusted averages were 11.38. Although the adjusted averages of the control groups increased compared to their normal averages, it is a low average compared to the experimental group.

Bonferroni's test within ANCOVA analysis was used to determine statistical significance of difference between groups on mathematics reasoning scale, experiment and control 1 and control 2. The Bonferroni test result and the difference between the post-test points of the groups are shown in Table 7:

Table 7. *ANCOVA Results of the Groups' Posttest Scores*

Grup	Groups	Mean Difference	Std. Error	p
Exprimental	Control 1	3,67	1,56	.06
	Control 2	6,62*	1,63	.00
Control 1	Exprimental	-3,67	1,56	.06
	Control 2	2,95	1,52	.17
Control 2	Exprimental	-6,62*	1,63	.00
	Control 1	-2,95	1,52	.17

When the analysis of covariance results in Table 7 are analyzed according to the post- test scores corrected according to the pre-test scores, a statistically meaningful difference was seen between the experimental group and the Control 2 group (F(2-68)=8.23; p=.00). That is, after ANCOVA analysis, the common effect showed a statistically meaningful difference among the students in the experimental group using the IG program.

Findings Related to the Third Sub-Problem

One-way ANOVA was used to determine whether the posttest scores on the mathematical reasoning scale were statistically meaningful differences between the students in the experimental group and the Control 1 and Control 2 groups, as well as the gender of the students.

According to the described analysis, the mean posttest values of the girls (X=15.76, SD=7.45) were higher than the mean values of the boys (X=13.50, SD=8.23) and the findingsare presented in Table 8:

Table 8. *One-Way Variance Analysis of Mathematical Reasoning Post-test Scores by Gender*

	Sum of Square	sd.	Mean Square	F	p
Between Groups	92,035	1	92,035	1,483	.22
Within Groups	4343,618	70	62,052		
Total	4435,653	71			
(p>.05)					

(1=experiment group, 2=control 1 group, 3=control 2 group)

According to the analysis, there was no statistically significant differ by gender between the Mathematical Reasoning Scale posttest scores of the students participating in the study (F=1.483, p>.05).

Findings Related to the Fourth Sub-Problem

Following the study, which was conducted in accordance with the study plan, a one-way analysis of variance was used to determine if there was a statistically meaningful difference between the post-test scores of all students in the groups and the end-of-semester grades in the school mathematics course, and the findings are presented in Table 9:

Table 9. *One-Way Variance Analysis of Mathematical Reasoning Post-test Scores and Mathematics Achievement Grades*

	Sum of Square	sd.	Mean Square	F	p	Difference
Between Groups	21344,046	26	820,925	5,004	.00	1>2
						1>3
Within Groups	7382,274	45	164,051			
Total	28726,319	71				
(p<.05)						

(1=experiment group, 2=control 1 group, 3=control 2 group)

Table 9 indicates that the distance between the Mathematical Reasoning Scale posttest scores of the participants in the study and their grades in the mathematics course was statistically significant ($F=5.004$, $p<.05$).

Discussion, Conclusion and Suggestions

The purpose of the study was to determine the effectiveness of IG on MRA and mathematics achievement of 6th grade middle school students. It is stated that students' learning through games in the classroom environment and having in-class interaction and discussion environments positively affect the development of MRA (Schliemann & Carraher, 2002). In fact, IG provide important opportunities for students to encounter, use and interact with different reasoning abilities. In this regard, the intelligence game training was applied to the students who participated in the research according to the prepared program and the results were evaluated. The analysis revealed that there was a statistically meaningful difference between the post-test values of the participants in the experimental group and the post-test values of the participants in the control 2 group. This can be interpreted as an improvement in the MRA for students taking the IG course. According to Vygotsky (1978), while children's interaction with their peers improves their reasoning processes, in such environments, individuals will have the chance to be influenced by each other's reasoning styles (Maher & Davis, 1995), and studies revealing that providing environments where students can put forward, explain and discuss their ideas enables them to develop their reasoning abilities (Altıparmak & Öziş, 2005; Steen, 1999) also support the result of the development of MRA in students taking IG lessons. Similarly, there are studies showing that students' interaction and being aware of each other's reasoning positively affect their reasoning abilities (Yankelewitz, 2009; Zembat, 2008). The mathematical reasoning posttest results of the students in the study did not show a statistically meaningful difference by gender. On the contrary, in some studies where students' MRA were measured, significant differences were found in favor of female students (Demir, 2019; Karaduman, 2018). These studies were related to proportional reasoning, one of the types of mathematical reasoning, and as a consequence it was suggested that applications could be made that might attract the attention of male students more. Similarly, in our study, IG that can attract more attention of male students can be selected. The final finding of our research is that the post-test scores on the MRA of the students who enrolled in the study were statistically different from their grades in the math course in school. In other words, students with high mathematical reasoning post-test scores also have high achievement grades in mathematics courses. In parallel with this result, Demirel (2015) investigated the efficacy of IG in students' achievement in mathematics and Turkish lessons and found that there was a significantly improved student achievement. In fact, it can be said that IG have a beneficial influence on students' math performance in school by improving their problem-solving and MRA.

Similarly, there are also studies showing that the IG course has a benefical and significant influence on students' problem solving, mathematical reasoning and positive attitudes towards mathematics (Demirel, 2015; Demirel & Yılmaz, 2016; Demirkaya & Masal, 2017; Kurbal,2015; Reiter et al., 2014; Saygı & Alkaş Ulusoy, 2019; Sargın & Taşdemir, 2020; Yöndemli, 2018; Zeybek & Saygı, 2018).

Based on these results, presenting IG as activities in the mathematics curriculum and ensuring active participation of students will contribute to the development of MRA. In addition, the IG course can be removed from being an elective course and can be conducted by experts in parallel with the mathematics course.

Conflicts of Interest: No conflict of interest has been declared by the authors.

Funding Details: This study was not funded by any organization.

Ethical Statement: Ethical approval for this research was provided by the Scientific Research and Publication Ethics Committee of Cukurova University in the field of Social Sciences and Humanities (date and number 05/04/2023-E.673968).

Credit Author Statement: Each author made an equal contribution to the study.

References

Adalar, H., & Yüksel, İ. (2017). Sosyal bilgiler, fen bilimleri ve diğer branş öğretmenlerinin görüşleri açısından zekâ oyunları öğretim programı. *Turkish Studies, 12*(28), 1-24. http://dx.doi.org/10.7827/TurkishStudies.12428

Adıyaman D. (2019). Sekizinci Sınıf Öğrencilerinin Cebirsel Akıl Yürütme Becerilerini Destekleyen Öğrenme Ortamından Yansımalar. (Yayın No.584629). Yükseklisans Tezi, Trabzon Üniversitesi, Trabzon. https://tez.yok.gov.tr/UlusalTezMerkezi

Airasian, P. W. & Walsh, M. E. (1997). Constructivist cautions. *Phi Delta Kappan, 78(*6), 444- 449. https://people.wou.edu/~girodm/library/Airasian.pdf

Alkaş Ulusoy, Ç., Saygi, E., & Umay, A. (2017). İlköğretim matematik öğretmenlerinin zekâ oyunları dersi ile ilgili görüşleri. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 32(2), 280-294. http://www.efdergi.hacettepe.edu.tr/

Altıparmak, K. & Öziş, T. (2005). Matematiksel İspat ve Matematiksel Muhakemenin Gelişimi Üzerine Bir İnceleme. *Ege Eğitim Dergisi, 6*(1), 25-37. https://dergipark.org.tr/en/download/article-file/57090

Apaydın, Z. & Taş, E. (2010). Farklı Etkinlik Tiplerinin Öğretmen Adaylarının Akıl Yürütme Becerileri Üzerindeki Etkileri. *Türk Fen Eğitimi Dergisi, 7*(4), 172-188. http://www.tused.org/index.php/tused/article

Arslan, C. (2007). İlköğretim Öğrencilerinde Muhakeme Etme ve İspatlama Düşüncesinin Gelişimi. (Yayın No.210145). Doktora Tezi. Uludağ Üniversitesi Sosyal Bilimler Enstitüsü, Bursa. https://tez.yok.gov.tr/UlusalTezMerkezi

Aydoğan Yenmez, A.& Gökçe, S. (2022). *Matematiksel akıl yürütme*. Anı yayıncılık. (p.16).

Bostancı Ü. Y., Kuzu O. & Sıvacı S. Y. (2020). Sekizinci Sınıf Öğrencilerinin Geometriye Yönelik Öz-Yeterlik Algıları ve Geometrik Akıl Yürütme Becerilerinin İncelenmesi. *Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi, 54*, 283-310. https://dergipark.org.tr/en/download

Bursalı G. G. (2019). Ortaokul Öğrencilerinin Olasılıksal Akıl Yürütme Seviyelerinin İncelenmesi. (Yayın No.570871). Yükseklisans Tezi, Bartın Üniversitesi, Bartın. https://tez.yok.gov.tr/UlusalTezMerkezi

Büyüköztürk Ş., Çakmak K. E., Akgün Ö. E., Karadeniz Ş. & Demirel F. (2009). *Bilimsel Araştırma Yöntemleri.* Pegem Akademi. (p.13).

Çoban H. (2019). Farklılaştırılmış Öğretim Tasarımının Öğrencilerin Matematiksel Muhakeme Becerilerine, Bilişötesi Öğrenme Stratejilerini Kullanma Düzeylerine ve Problem Çözme Becerilerine Etkisi. Yayınlanmamış doktora tezi. Balıkesir Üniversitesi, Balıkesir.

Çomruk, B. (2018). Kırsal Bölge Ortaokul Öğrencilerinin Orantısal Akıl Yürütme Stratejilerinin Materyal Destekli Problem Çözme Sürecinde İncelenmesi. (Yayın No.514476). Yüksek lisans tezi. Akdeniz Üniversitesi, Antalya.

Çıkla, O. A., & Duatepe, A. (2002). İlköğretim matemetik öğretmen adaylarının orantısal akıl yürütme becerileri üzerine niteliksel bir çalışma. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 23(23).

Demir, S. (2013). Farklılaştırılmış Öğretim Yöntemlerinin Öğrencilerin Akademik Başarı Öğrenme Yaklaşımları ve Kalıcılık Puanları Üzerindeki Etkisi. (Yayın No.327546). Doktora Tezi. Yıldız Teknik Üniversitesi, İstanbul.

Demir Ü. (2019). Ortaokul 7. Sınıf Öğrencilerinin Orantısal Akıl Yürütme Süreçlerinin Bilişsel Açıdan İncelenmesi. (Yayın No.576121). Yükseklisans Tezi. Bayburt Üniversitesi, Bayburt.

Demirel, T. (2015). Zekâ oyunlarının Türkçe ve Matematik derslerinde kullanılmasının ortaokul öğrencileri üzerindeki bilişsel ve duyuşsal etkilerinin değerlendirilmesi. (Yayın No.418220) Yayınlanmamış doktora tezi. Atatürk Üniversitesi, Erzurum.

Demirel, T., & Yılmaz, T. K. (2016). Akıl Oyunlarının Matematik Ve Türkçe Derslerinde Kullanılması: Geliştirme Süreci Ve Öğretmen-Öğrenci Görüşleri. Akademik Bilişim Konferansı, Aydın. https://ab.org.tr./ab16/bildiri/80.pdf

Demirkaya, C., & Masal, M. (2017). Geometrik-Mekanik Oyunlar Temelli Etkinliklerin Ortaokul Öğrencilerinin Uzamsal Düşünebilme Becerilerine Etkisi. *Sakarya University Journal of Education, 7*(3), 600-610. https://pdfs.semanticscholar.org/

Dokumacı Sütçü, N. (2017). Zekâ oyunlarının ortaokul 7. Sınıf öğrencilerinin uzamsal yeteneklerine ve uzamsal yetenek öz-değerlendirmelerine etkisi. Yayınlanmamış doktora tezi. Dicle Üniversitesi, Diyarbakır.

Duatepe, A., Akkuş-Çıkla, O. & Kayhan, M. (2005). Orantısal Akıl Yürütme Gerektiren Sorularda Öğrencilerin Kullandıkları Çözüm Stratejilerinin Soru Türlerine Göre Değişiminin İncelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 28*, 73-81.

Erdem E. (2011). İlköğretim 7. Sınıf Öğrencilerinin Matematiksel ve Olasılıksal Muhakeme Becerilerinin İncelenmesi. Yükseklisans Tezi, Adıyaman Üniversitesi, Adıyaman.

Erdem, E., Gürbüz, R. & Duran, H. (2011). Geçmişten Günümüze Gündelik Yaşamda Kullanılan Matematik Üzerine: Teorik Değil Pratik. *Türk Bilgisayar ve Matematik Eğitimi Dergisi, 2(*3), 232-246. https://d1wqtxts1xzle7.cloudfront.net/88049793/201322-libre.pdf?1656424087

Erdem E. (2015). Zenginleştirilmiş Öğrenme Ortamının Matematiksel Muhakemeye Ve Tutuma Etkisi. (Yayın No.381651). Doktora Tezi. Atatürk Üniversitesi, Erzurum.

Erdem E. & Gürbüz R. (2015). An Analysis Of Seventh-Grade Students' Mathematical Reasoning. *Çukurova University Faculty of Education Journal, 44*(1), 123-142. https://dergipark.org.tr/en/download/article-file/46542

Ersoy E., Yıldız İ. & Süleymanoğlu E. (2017). 5. Sınıf Öğrencilerinin Matematiksel Muhakeme Becerileri Üzerine Bir Çalışma. *International Periodical for the Languages, Literature and History of Turkish or Turkic, 12(*17). 179-194. http://dx.doi.org/10.7827/TurkishStudies.11702

Ersoy E. & Bal-İncebacak B. (2017). 7. Sınıf Öğrencilerinin Muhakeme Becerileri. International Online Journal of Educational Sciences, 9 (1), 262 – 275. https://d1wqtxts1xzle7.cloudfront.net

Garfield, J. & Ben-Zvi, D. (2009). Helping Students Develop Statistical Reasoning: Implementing A Statistical Reasoning Learning Environment. Teaching Statistics, 31(3), 72-77. https://doi.org/10.1111/j.1467-9639.2009.00363.x

Gliner A. J., Morgan A. G. & Leech L. N. (2015). (Ed. Selahattin Turan). Uygulamada Araştırma Yöntemleri Desen ve Analizi Bütünleştiren Yaklaşım. Nobel Akademik Yayıncılık. (p.60, 125).

Gürbüz, R. (2006). Olasılık Kavramlarıyla İlgili Geliştirilen Öğretim Materyallerinin Öğrencilerin Kavramsal Gelişimine Etkisi. Dokuz Eylül Üniversitesi Buca Eğitim Fakültesi Dergisi, 20, 59-68.

Gürbüz, R. (2008). Matematik Öğretiminde Çoklu Zekâ Kuramına Göre Tasarlanan Öğrenme Ortamlarından Yansımalar. Doktora Tezi, Karadeniz Teknik Üniversitesi, Trabzon.

Gürbüz, R., Erdem, E. & Uluat, B (2014). Reflections From The Process Of Game-Based Teaching Of Probability. *Croatian Journal of Education, 16*(Sp. Ed. 3), 109-131. https://hrcak.srce.hr/en/file/191380

Güven Y. & Göncü H. B. (2021). Tahmin Becerilerinin Geliştirilmesinin Çocukların Akıl Yürütme Becerileri ve Sezgisel Matematik Yeteneklerine Etkisi. *Akdeniz Journal of Education, 4*(1), 1-19. https://dergipark.org.tr/

İlhan A. & Aslaner R. (2018). Matematik Öğretmeni Adaylarının Geometrik Şekiller Üzerine Akıl Yürütme Becerilerinin Üniversite ve Sınıf Düzeyi Değişkenleri AçısındanİncelenmesiI. *İnönü Üniversitesi Eğitim Fakültesi Dergisi, 19*(2), 82-97. https://doi.org/10.17679/inuefd.332285

Karaduman B. (2019). Ortaokul 6. , 7. Ve 8. Sınıf Öğrencilerinin Orantısal Akıl Yürütme Becerilerini ve Matematik Dersine Yönelik Tutumlarının Bazı Değişkenler Açısından İncelenmesi: Cinsiyet Ve Sınıf Düzeyi Perspektifi. (Yayın No.534992). Yükseklisans Tezi, Başkent Üniversitesi, Ankara.

Kasmer, L. & Kim, O. K. (2011). Using Prediction To Promote Mathematical Understanding And Reasoning. *School Science and Mathematics, 111*(1), 20-33. https://doi.org/10.1111/j.1949-8594.2010.00056.x

Kaya, D., Keşan, C., İzgiol, D. & Erkuş, Y. (2016). Yedinci Sınıf Öğrencilerinin Cebirsel Muhakeme Becerilerine Yönelik Başarı Düzeyi. *Turkish Journal of Computer and Mathematics Education, 7*(1), 142-163. https://doi.org/10.16949/turcomat.95945

Kiili, K. (2007). Foundation for problem-based gaming. *British journal of educational technology, 38*(3), 394-404. https://doi.org/10.1111/j.1467-8535.2007.00704.x

Koç, G., & Demirel, M. (2004). Davranışçılıktan yapılandırmacılığa: eğitimde yeni bir paradigma. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 27*, 174-180.

Kramarski, B. & Zeichner, O. (2001). Using Technology To Enhance Mathematical Reasoning: Effects Of Feedback And Self-Regulation Learning. *Educational Media International, 38*(2-3), 77-82. https://doi.org/10.1080/09523980110041458

Kramarski, B. & Zoldan, S. (2008). Using Errors As Springboards For Enhancing Mathematical Reasoning With Three Metacognitive Approaches. *The Journal of Educational Research, 102*(2), 137-151. https://doi.org/10.3200/JOER.102.2.137-151

Kurbal, M. S. (2015). An investigation of sixth grade students' problem solving strategies and underlying reasoning in the context of a course on general puzzles and games. (Yayın No.399985). Master's thesis. Middle East Technical University, Ankara.

Lithner, J. (2005). *A framework for analysing qualities of mathematical reasoning: Version 3* (p.3)

Lithner, J. (2008). A research framework for creative and imitative reasoning. Educational Studies in mathematics, 67, 255-276. https://link.springer.com/article/10.1007/s10649-007-9104-2

Maher, C. A. & Davis, R. B. (1995). Children's explorations leading to proof. In C. Hoyles and L. Healy (Eds.), *Justifying and proving in school mathematics* (pp. 87-105). Mathematica Sciences Group, Institute of Education, University of London, London.

Marzano, R. J. (2000). Transforming Classroom Grading. Alexandria, VA: Association for Supervision and Curriculum Development. https://eric.ed.gov/?id=ED446072MEB, (2005). Ortaokul matematik dersi (5,6,7 ve 8. sınıflar) öğretim programı. Ankara: Talim ve Terbiye Kurulu Başkanlığı.

MEB, (2013). Ortaokul matematik dersi (5,6,7 ve 8. sınıflar) öğretim programı. Ankara: Talim ve Terbiye Kurulu Başkanlığı.

MEB, (2013). Ortaokul seçmeli akıl ve zekâ oyunları dersi (5,6,7 ve 8. sınıflar) öğretim programı. Ankara: Talim ve Terbiye Kurulu Başkanlığı.

MEB, (2015). Ortaokul matematik dersi (5,6,7 ve 8. sınıflar) öğretim programı. Ankara: Talim ve Terbiye Kurulu Başkanlığı

Nickerson, R. S. (2004). Cognition and chance: The psychology of probabilistic reasoning. Psychology Press.

Öz T. (2017). 7. Sınıf Öğrencilerinin Matematiksel Akıl Yürütme Süreçlerinin İncelenmesi (Yayın No.485981). Doktora Tezi, Atatürk Üniversitesi, Erzurum.

Pape, S. J., Bell. C. V., & Yetkin, I. E. (2003). Developing Mathematical Thinking And Self Regulated Learning: A Teaching Experiment İn A Seventh-Grade Mathematics Classroom. Educational Studies in Mathematics, 53, 179-202.

Pilten P. (2008). Üstbiliş Stratejileri Öğretiminin İlköğretim Beşinci Sınıf Öğrencilerinin Matematiksel Muhakeme Becerilerine Etkisi. (Yayın No.214521). Doktora tezi. Gazi Üniversitesi, Ankara.

Poçan S., Yaşaroğlu C.& İlhan A. (2017). Ortaokul 7. Ve 8. Sınıf Öğrencilerinin Matematiksel Akıl Yürütme Beceri Düzeylerinin Bazı Değişkenler Açısından İncelenmesi. *The Journal of International Social Research, 10 (*52), 808-818. http://dx.doi.org/10.17719/jisr.2017.1937

Reiter, H. B., Thornton, J., & Vennebush, G. P. (2014). Using Kenken To Build Reasoning Abilities. Mathematics Teacher, 107(5), 341-347. https://doi.org/10.5951/mathteacher.107.5.034

Sargın, M., & Taşdemir, M. (2020). Seçmeli Zekâ Oyunları Dersi Öğretim Programının Öğretmenler Tarafından Değerlendirilmesi (Bir Durum Çalışması). *Elektronik Sosyal Bilimler Dergisi, 19*(75), 1444-1460. https://doi.org/10.17755/esosder.653817

Saygı, E., & Alkaş Ulusoy, Ç. (2019). İlköğretim matematik öğretmen adaylarının hafız oyunları ile hafıza oyunlarının matematik öğretimine katkısına ilişkin görüşleri. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 19*(1), 331-345. https://doi.org/10.17240/aibuefd.2019.19.43815-446550

Schliemann, A. D. & Carraher, D. W. (2002). The Evolution Of Mathematical Reasoning: Everyday Versus İdealized Understandings. *Developmental Review, 22*(2), 242-266.

Simon, M. A. (1996). Beyond inductive and deductive reasoning: The search for a sense of knowing. *Educational Stedies in Mathematics, 30*(2), 197-210.

Steen, L. A. (1999). Twenty Question About Mathematical Reasoning. L. V. Stiff, F. R. Curcio. (Eds.), *Developing mathematical reasoning in grades K-12*. Reston, VA: NCTM.

Şahin, Y. (2012). İlköğretim Matematik Öretmen Adaylarının Geometrik Akıl Yürütmelerinin Bazı Değişkenler Açısından İncelenmesi. (Yayın No.317786).Yüksek lisans tezi, Hacettepe Üniversitesi, Ankara.

Şahinkaya T., Öztürk M. & Albayrak M. (2022). Üstbilişsel IMPROVE Tekniğinin Oran- Orantının Öğretimi ve Orantısal Akıl Yürütme Becerisinin Geliştirilmesi Üzerine Etkisi. *Kocaeli Üniversitesi Eğitim Dergisi, 5*(2), 495-516. https://doi.org/10.33400/kuje.1137016

Tabachnick, B. G. & Fidell, L. S. (2013). *Using multivariate statistics*. Boston: Pearson.

Umay, A. (2003). Matematiksel muhakeme yeteneği. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 24*(1), 234-243.

Vygotsky, L. S. (1978). Mind and society: The development of higher mental processes. Cambridge, MA: Harvard University Press. https://books.google.com.tr/

Way, J. (2003). The Development Of Young Children's Notions Of Probability. In Proceedings of CERME, 3, 1-8.

Yankelewitz, D. (2009). The Development Of Mathematical Reasoning İn Elementary School Students' Exploration Of Fraction İdeas. Yayınlanmamış doktora tezi. The State University of New Jersey, USA.

Yöndemli, E. N., & Taş, İ. D., (2018). Zekâ oyunlarının ortaokul düzeyindeki öğrencilerde matematiksel muhakeme yeteneğine olan etkisi. Turkish Journal of Primary Education, 3(2), 46-62.

Zembat, I. O. (2008). Pre-Service Teachers' Use Of Different Types Of Mathematical Reasoning İn Paper-And-Pencil Versus Technology-Supported Environments. *International Journal of Mathematical Education in Science and Technology, 39(*2), 143–160. https://doi.org/10.1080/00207390701828705

Zeybek, N., & Saygı, E. (2018). Apartmanlar Oyununun Ortaokul Matematik Öğretmen Adaylarının Uzamsal Görselleştirme Yeteneklerine Olan Etkisi. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 18*(4), 2541-2559. https://doi.org/10.17240/aibuefd.2018.18.41844-504903

International Journal of Progressive Education, Volume 21 Number 5, 2025

Teaching Values Through Story Telling in Rwanda's Lower Primary Schools

Sylvestre Ntabajyana
University of Rwanda

Gabriel Nizeyimana
University of Rwanda

Wenceslas Nzabalirwa
University of Rwanda

Jean Leonard Buhigiro
University of Rwanda

Abstract
This research aimed at investigating how Rwanda's lower primary school teachers understand teaching values using stories and the techniques they use to teach these values. Data of this study were collected qualitatively using interviews, observation, and document analysis techniques. Research participants were lower primary school teachers who teach Kinyarwanda subject in which stories are mostly taught. The data collected were analysed using the thematic content analysis method. Data analysis yielded two themes: teachers' views on teaching values via stories and techniques that teachers use for values education via stories. Research findings revealed that teachers do understand the role of stories in instilling values among children, and they use some motivating techniques while telling stories. However, results of this research show that the implementation of values education via stories is still problematic because some teachers ignore completely the teaching of the values embedded in the stories; instead, they prioritize teaching language skills. Moreover, competence-based teaching and learning which is in use in Rwanda is sacrificed to teacher-centred. It was recommended that teachers should give value to its status of being one of the key competencies that the Competence Based Curriculum (CBC) framework in Rwanda focuses on, and they should use constructivism mode of teaching and learning to enhance quality values education.

Keywords*: Storytelling, stories, values, lower primary, teachers, learners*

Correspondance*:* Sylvestre Ntabajyana**,** Humanities and Language Education, University of Rwanda
Email: ntabajyana2@gmail.com

Introduction

"Values are acquired in life, they are not innate to the individual" (Şahin, 2021, p.577), hence they should be taught since childhood. It is at this stage of human development that children need to learn values that play a vital role in shaping their behaviours, because, according to Piaget (1951; 1999), children whose ages are between 2 and 8 years like leaning through imitating behaviours of animated characters and metaphors of nature. A story, besides its role in teaching language skills and entertaining children, "has been widely used by many teachers to play this crucial role of teaching values to young children" (Rahiem et al. 2017, p. 302). Thus, teaching values reflect the teachers' understanding of these values and the way they teach them.

It is worth noting that storytelling is a fun way of instilling values in children. Through this fun way, children easily understand the messages of the story and internalize the values embodied in them (Rahiem et al. 2017). On this point, Gartiand & Dolan (2014) affirm that it is almost impossible to teach uninterested children. Indeed, various researchers believe that characters in stories can influence the listeners the same way real people can.

Al-Somadi (2012, p.542) noted that children like imitating the people they admire and that stories, through characters, provide "abundance of proper role models." He further says that "sometimes stories can make even stronger impression on children than real people". This is supported by Rahiem et al. (2017) who revealed that stories convey values without imposing on children what to do but interest them in what to do, which is in line with the competence-based learning. In this regard, CBC assigns a significant role to values education, and values should be taught in all subjects (REB, 2015). On this point, stories constitute a good channel to inculcate in children a deep sense of values which guide them for pro-social behaviours (León & Castañeda, 2018).

However, despite its significant role in values education, storytelling may not be fully exploited in Rwandan schools to teach values, and there is still little research on its use in Rwandan schools. To support this, Tappan and Brown (1989) affirm that storytelling is not given a valuable place in modern education. Hence, Durdukoca (2019) is convinced that the escalation of misbehaviours among school leavers across the world reflects the lack of adequate values education. In this regard, Ngamije (2021) affirm that there is inadequate teaching of values in Rwandan schools due to insufficient training of pre-service and in service teachers on values education. That is why, to better teach values, Rahim and Rahiem (2012, p. 457) conclude that "teachers should be encouraged to explore the content of stories and help children connect their own experiences and lives to the story."

Thus, the purpose of this study is to investigate lower primary teachers' understanding of values education through storytelling and the techniques they use to implement it. The finding of this study will be useful to teachers, parents, and educationists interested in stories for values education. It will also be useful to publishers and illustrators in their striving to publish appropriate storybooks for children. Hence, this study is meant to answer the following research questions:

- What are Rwanda's lower primary grade teachers' views about the use of stories in teaching values?

- How do Rwanda's lower primary grade teachers teach values imbedded in children's stories?

Literature review

Storytelling and story reading

"Stories can be read or told to pupils in class," (Sim, 2004, p. 140). Storytelling is about telling a story without any printed page in the storyteller's hand(s) Chesin, 1966; Sim, 2004, Cishe, 2024)). The

same authors further said that the story told has the same attributes as the story read but at different levels, because, while telling a story, the narrator maximizes using his/her gestures, voice, eye contact and body. On this point, Isbell et al. (2004) assert that "The storyteller usually uses more repetitive phrases, sounds, and gestures than the story reader."

Additionally, when reading, a reader uses the exact words in a given story but when a story is told verbally, the narrator uses words creatively (Lucarevschi, 2016), but the message of the story remains the same whether the story is read aloud or told. Likewise, Isbell et al. (2004, p.158) stated that when a story is read, the words are "fixed upon a page" when the same story is told, the words are recreated.

It is clear that, both storytelling and story reading, when properly used, can play a great role in inculcating values in the learners. Thus, since the end goal of this study is about teaching values through stories, we adopt using the term 'storytelling' to mean both (telling a story verbally and reading a story aloud). On this point, we agree with Isbell et al. (2004, p.158) who expressed that "storytelling and story reading are similar in content."

Teaching values through storytelling

Values are important in children's life. Aroff (2014) argues that teaching values is to help children to be aware of the good, love the good and do the good. Accordingly, values education helps a student to shape his/her behaviour. Indeed, there are various ways values can be taught to children. Vitz (1990) and Balakrishnan and Thambu (2017) affirm that storytelling is one of the methods we can use to instil values among children. They add that this power of storytelling is due to the fact that stories provide different options to deal with dilemmas. Moreover, a story preserves cultural values which are transmitted from generations to generations (Court & Rosental, 2007).

According to Bandura (1977; 1986), children like learning through imitation. Stories provide some positive examples to children, and children like imitating story characters more than imitating real figures in ordinary world (Al- Somadi, 2012, p. 542). Hence, stories help children to better understand the real world in enjoyable way and understand the people in their environment (Yoo, 1997, Wehmeier, 2025).

For a story to be successful in achieving its goal of values education, a storyteller should "use some techniques such as voice variation, gestures, body language and actions that involve children in the story" (Newell, 1995, p.424).

Moreover, there are three steps one has to go through while teaching values using storytelling: pre-storytelling step, during storytelling step and after storytelling step (Rahasya, 2017). In the first step, students are engaged in activities preparing them to actively listen to the story. The second step is the real activity of telling the story as learners act as active listeners by adding their inputs in the story. The third step is a concluding part in which the students reflect on the story (Ellis & Brewster, 1991, cited in Rahasya, 2017). On this point, Rahim and Rahiem (2012) noted that "Discussions before, during and after storytelling activities help children understand the message of the story well"—thus they internalize values embedded in it (the story).

Moreover, to fully help learners adopt values embedded in the stories, teachers should make sure that any storytelling session be guided by "clear objectives and effective pedagogical strategies" (Strangeways & Papatraianou, 2016 as quoted in Gunawardena & Brown, 2021, p.37).

Theoretical framework

This study adopted the constructivism theory of teaching and learning. According to this theory, a learner constructs knowledge and meaning from his/her experience (Bada & Olusegun, 2015).

Therefore, the teacher, during storytelling lessons, should involve the learners as much as possible by allowing their critical thinking.

"There are two major types of constructivism: Piaget's individual or cognitive constructivism and Vygotsky's social cognitive constructivism" (Kalina & Powell, 2009, p.248). It is worth noting that Piaget's cognitive constructivism focuses on knowledge construction by an individual learner while Vygotsky stresses that knowledge is socially constructed. They both (Piaget and Vygotsky) agree that in both types the teacher's role is to facilitate and guide the learners, not dictate them on what to do (Kalina& Powell, 2009).

Teachers should be familiar with both (cognitive constructivism and social constructivism) because their crucial roles in classroom make competence-based learning a reality (Kalina & Powell, 2009). Since Rwandan schools are fully implementing CBC, all teachers should use this approach in their everyday teaching and learning activities. To emphasize the relationship between constructivism and CBC, Luambano (2014 as cited in Mulenga & Kabombwe, 2019, p.125) stated that there is no difference between competence-based curriculum and teaching via constructivist approach.

Hence, this theoretical understanding was crucial for this study because, as stipulated in Rwanda curriculum framework, teachers should help the learners engage in activities "both in groups (social constructivist mode) and as individuals (constructivism mode)", (REB 2015, p. 23). Likewise, Hanlon (2000) as cited in Adie and Ushie (2018) concludes that teaching values through stories will be successful if the teacher will fully involve the learners in a competence-based mode.

Methodology

Design

Qualitative research approach (Creswell, 2012) was adopted in this study. We used the phenomenology method which is about describing a lived experience (Mapp, 2008) by participants. Since there are different types of phenomenology, this study adopted Interpretive Phenomenological Analysis (IPA) which allows the interpretive approach to be used as a method of analysis (Jackson, Vaughan & Brown, 2018). In this study, teachers expressed their experiences in teaching values via storytelling.

Instruments

For triangulation purpose, various sources were used to collect data: individual interviews, observations and document analysis. Collecting data from various sources enhances better understanding of a phenomenon under study (Bogdan & Biklen, 2005).

Population and sampling

Purposive sampling was used to select participants in this study (Creswell, 2012). The selection was based on key informants who could provide rich and relevant data to answer the research questions (Patton, 2002). In this study, we selected 15 lower primary school teachers who teach Kinyarwanda subject. The Kinyarwanda teachers were chosen because many children's stories in Rwandan schools are taught in the Kinyarwanda subject. Hence, a total of 15 semi structured interviews were conducted. With document analysis, we focused on the Rwanda Competence Based Curriculum (CBC) framework, lower primary Kinyarwanda students' books and Kinyarwanda teachers' guides, as well as storybooks used in class. Besides, we conducted observation of lessons where stories were told to children by the teachers. We conducted observations in Primary one, Primary two, and Primary three respectively.

Validity and reliability

Individual interviews were audio recorded. Then they were transcribed in Kinyarwanda before being translated into English by the researchers. Member check technique that consists in giving back the transcriptions to their respective interviewees to check the authenticity of the information they have provided was used. Then after, we embarked on the analysis which was done inductively through coding. The codes yielded themes which were used for discussions.

Ethical consideration

Participation in this study was on voluntary basis and the consent form was signed by teachers, and some teachers accepted to be taken photos. Confidentiality was kept when reporting using 'T' for teacher, followed by a number while reporting the findings. Before the effective classroom observations, school leaders were contacted to allow us to conduct these observations during storytelling lessons.

Study limitations

The study adopted a phenomenology methodology. Hence the findings were limited to the information from the teachers and the observations of lessons during which teacher-students' interactions and learners' behaviours were observed.

We acknowledge that other methods (such as ethnography which allows a longitudinal study) would have yielded much information if they were applied—this would have allowed long period observations and interaction with the participants to witness variations in methods of storytelling and children's behaviours, as well as consistency in behaviours adopted as a result of values acquired during storytelling sessions.

Findings and discussions

The findings of this study derived from the result of individual interviews, observations and document analysis. These findings are guided by the following two themes that emerged from the data: teacher's views on values education via storytelling and the ways teachers teach values via stories.

Teachers' views on values education via storytelling

In this study, all the teachers interviewed argued that the storytelling is a precious method of teaching values. For instance, in T9's words, *"Stories play a great role in values education because they are about social lives. They depict what children meet in their daily experiences—from our cultures*." As can be inferred from this T9's answer, some of the values embedded in the stories used in classes are drawn from society where children live. This corroborates with Gunawardena and Brown (2021, p. 36) who assert that "Storytelling is a culturally inclusive and widely used pedagogical technique. "This was confirmed by some participants who gave examples of values they find important in the stories that they teach: '*helpfulness', 'love', 'forgiveness', 'peace', 'tolerance', 'respect', 'hard-work', 'cleanliness', and 'environment protection*'. As clarification, T5 had this to say:

> Stories convey values very well. For instance, when a child listens to a story in which there is a value of 'helpfulness', the very child will know the importance of helpfulness. He/she may apply it or emphasize it.

Additionally, T3 summarized one of the stories he uses to inculcate values in her children:

> For instance, there is a story in which Gikeri (a toad) is a character. Once, Gikeri went to pay a visit to her neighbour. Gikeri went there with her children who were very dirty. The neighbour,

seeing them dirty, he decided to clean them. Gikeri was very happy seeing her children cleaned by the neighbour. Then, she was thankful to him.

From this Gikeri story, children were asked about the lessons they learnt. In their answers you could find values such as peace (living peacefully with neighbours/peers etc), cleanliness (The neighbour of Gikeri cleaned her children to show the importance of cleanliness, etc.)." These quotes above present a good example of how stories are crucial to values education since they contain some values essential to children's life.

Likewise, during observation, T1 taught a lesson on the story '*Inyamaswa zo mu gasozi* (translation: '*Wild animals')*. During the lesson, through questioning, he guided the learners to discover and reflect on the values embedded in the story as follows:

Teacher (T): What can you do to preserve the wild animals?

Student (S): We can do it by not harming the animals.

T: How?

S1: By avoiding killing them (animals).

S2: By avoiding poaching on them.

T: Why do you think some people poach on animals?

S3: They become poachers because they need some parts of the animals such as horns to sell. These horns are used to make some ornaments. But it is not good because they kill animals.

*T: (*To emphasize lifelong learning among children the teacher asked*): after today's lesson, what decision have you taken throughout life as you grow?*

S1: Protecting animals

S2: Avoiding killing animals

S 3: Avoiding poaching on animals

These short answers above show that the learners, guided by the teacher, have discovered themselves the 'environment protection' value from the story. Moreover, the learners themselves decided on what to do in the future to turn the value into attitude and behaviour, and this is emphasised on by the Competence Based Curriculum framework (REB, 2015) in Rwanda. Within this perspective, Uhrmacher et al. (2013) noted that, in a competence-based learning, students reflect on their own learning and take decisions.

We assume that, the decision made by the learners would be turned into actions in the future as expressed in a Kinyarwanda proverb: '*Akari ku mutima gasesekara ku munwa*' (which can be translated as "*what is expressed through the mouth normally derives from the inner thought'*). Additionally, another Kinyarwanda proverb goes, '*Ukuri gushirira mu biganiro*' which can be translated as "*From dialogues/discussions comes the truth*". In this line, we support Setiawan and Aisyah (2016) who affirm that the knowledge that children construct themselves will have a deepen place in memory and will be remembered for long time.

However, even if children got time to answer the teacher's questions, they (learners) did not get opportunity to discuss in groups to construct knowledge socially as supported by Schuitema et al. (2008)

that students should be given opportunity to work in small groups, which enhances cooperative learning to stimulate critical thinking**.**

Adding another benefit of teaching value via storytelling, T7 clarified how simpler it is when values are taught through storytelling:

> It becomes easier for me to teach values embedded in a story rather than using any method—for instance, instead of saying to the students 'do not steal', it is better to tell them a story in which there is a character who stole something but got a punishment for that.

This view by T7 is supported by various findings. For instance, in his study on students' opinions about the effect of value-themed stories used in education, Kasapoglu (2015, p.1782) found that storytelling is the best way of teaching values instead of "sermonizing and lecturing."

Additionally, some teacher participants said that due to the values embedded in stories, learners, after listening to the stories, share the values they gain from the stories with other children or even with adults in their villages:

> You know stories contain values. My learners, after listening to the stories here in classroom, they acquire some values. Then they share the same values by retelling the stories to other children and even to adult people in their homes" (T6&T7).

We find this sharing of values very crucial because, such repetitions encourage lifelong learning as Souza and Oberauer (2022, p. 3114) noted, "Repeated exposure is assumed to promote long-term learning". Thus, we assume that as children go on sharing the values through retelling the stories, they will be guided by the values embedded in them (the stories). "Stories form mental images in children's minds that remain with them" (Al- Somadi, 2012, p. 534).

It was also found that learners transfer the values learnt into behaviour as clarified by T1: *"some learners tell me that once they meet other children, they will forgive them for their wrong because of the story they listen to here in class*". This finding agrees with Molenda and Bhavnagri's (2009) finding in their study on 'Cooperation through Movement Education and Children's Literature' that children turned into behaviours the values they had learnt in the stories. In the same line T8 described the importance of values in children behaviour through an example:

> When a child listens to a story in which there are some children characters who are playing, automatically, that child will know the importance of playing. He/she will want to be like these children in the story. Consequently, the play value will mark him/her—he/she will put it into practice—he/she will be guided by the good habit of playing.

This is in line with Brooks (1985) as cited in Kanak and Onder (2017) that "Stories help children make identification with the characters" and they want to be like them through modelling. This finding is crucial for deeper learning in a constructivist mode because "proponents of this constructivist mode strive to have students transfer information learned into other learning or life situations that are novel" (Uhrmacher, Conrad & Moroye, 2013).

Indeed, from the interviews, all teacher participants acknowledge the importance of the story in teaching values. However, during classroom observations, when storytelling lessons were delivered, the researchers found that only few teachers taught values while others used stories for language teaching only. This finding seems to be consistent with that of Maphalala and Mpofu (2018, p.9) who found that "The teaching of values happens by default; teachers do not plan to teach their learners values."

The ways teachers teach values via stories

The results of this study show that teachers use various ways in teaching values via storytelling. They divide the storytelling sessions in three main steps: 'pre-storytelling', 'during storytelling', 'after storytelling'.

Step I: Pre-storytelling. All teacher participants in this study reported that they start lessons by 'sharing the titles of the stories' with the learners, explanation of 'new words' and 'showing illustrations to the learners', which was confirmed by observation sessions. For instance, T7 had this to say: "*I have to prepare children to be ready for the story. As they are ready, I tell them the title of the story they are going to listen to*." During observations, the teachers respectively, shared the titles (see figure 1 below) of the stories with the learners either by writing them (the titles) on the chalk boards (see an example in figure 1) or by telling them verbally to the learners.

We are convinced that the title hooks the listeners (here children) to the storytelling process. On this point, Lodge (2011 cited in Schaper, 2013, p. 103) argues that, "The title of a literary work is the first part of the whole work"; it "has considerable power to attract and condition the listener's attention."

As it was reported by all teachers, after writing the titles of the stories on chalkboards (or telling them (titles) to the learners verbally), they (teachers) proceeded with helping children understand new words to be used in the story. In T7's words "*If you have to use new words, define the word in simpler terms.* "This was evident during the observation sessions—many teachers wrote new words on the chalkboards (see Fig.1 below). Some other teachers, instead, told the titles to the learners verbally. Then, they asked them (the learners) to keep the titles in their mind. We found the telling of the title (in lieu of writing them on the chalkboard) to the students reasonable because, the teachers who did so teach Primary one students, who are not able to read at this level.

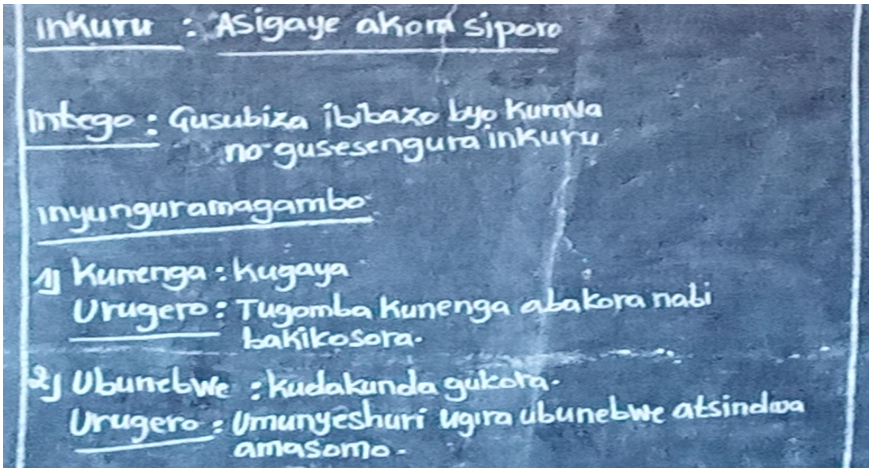


Fig.1: The title and the new vocabulary (words) in the story: *Asigaye akora siporo* (translated as 'Now *he does sport'*).

Additionally, the teacher participants used the technique of showing illustrations to the learners. As reported by all teachers in individual interviews, this technique makes the storytelling more attractive to children. In T1's words, *"Before I tell a story, children should observe the illustrations carefully—the illustrations make the story more and more enjoyable—interesting—captivating*. Likewise, in their study, Rahim and Rahiem (2012) found that "Children were more and more interested when they looked at the images, than when they listened to the story".

To help children reflect on illustrations all teacher participants confirmed that, after the students' watching the illustrations, they ask some questions to them (children). In T5's words: "*After all of the learners have watched the illustrations; they answer the questions on them (the illustrations). These questions related to illustrations help them discover the content—the meaning of the story"*.

The finding above is in line with that of Fang's (1996, p.138) who affirms that illustrations facilitate the children's "understanding of the written text." For many teachers in this study, often, the answers given by children on the story illustrations are different as evidenced by T7, "*As I ask them to say something on the illustrations observed, they normally give various answers*." This finding concurs with the constructivist theory of teaching and learning because, the proponents of constructivism such as Garner (1983) cited in Uhrmacher et al. (2013) agree that constructivism is a mode of teaching and learning that places great emphasis on multiple ways of understanding." In the same line, Sidhartani (2019, p.15) says that, "The process of understanding and interpreting the message is influenced by individual factors as a listener/observer." We, too, agreed with the above findings since each individual has his/her own way of constructing knowledge, which enables critical thinking. Hence, children giving a variety of answers deepen their understanding and internalization of the values learnt.

Other cases reported by the teachers relate to the behaviours adopted by learners as they watch illustrations during storytelling lessons. For instance, T3 revealed,

> The illustrations in the story make children very concentrated to listen to the story—they become attentive—they want to know if really what they say on illustrations is really in the story. So, they have to be silent to catch the whole story."

Likewise, T5 had this to say, *(...) stories also make learners eager to follow the storytelling calmly.* From this finding, we assume that using illustrations during storytelling helps teachers in the classroom management since children adopt positive behaviour by focusing on the story told to them. This finding is also supported by Vinyo et al. (2021, p.16) who argues that "interesting pictures of influential characters in a story catch children's attention." Likewise, as emphasized by T1, *"When children look at the illustrations, automatically they become attentive since they want to listen to the story until the end*."

The above findings from interviews were confirmed by the classroom observations. It was found that—during the observations, silently, all learners were focused on the story illustrations and the majority of them, as the questions on the story illustrations were asked, they wanted to answer by raising their hands.

Figure 2: Storytelling sessions

During classroom observations, we noticed that some teachers were rushing when showing illustrations to children. Indeed, children did not get enough time to go into details to depict the message conveyed by the images. On this point, Wilson et al. (2014, p.58) advise that to help children understand the story, "teachers must give children the time to linger over illustrations." Therefore, we suspect that some children failed to answer the questions on linking the illustrations with the text because of teachers' rushing while presenting illustrations to children, as reported by T8:

> Before telling the story, I show the pupils the illustrations. Then after, I ask them to compare the illustrations and the content of the story. But some students fail to give the relationship between what they see on the illustrations and the story itself."

Step II: During storytelling. In this study, during interviews, repetition as a technique used in this step was reported by some few teachers. In T7's words:

> In order to help the learners understand the story very well, I have to read the story for the second time. For this second reading, I have to read it a bit quicker than before.

We find repetition as a good way to help the learners fully understand the story, and be able to extract and reflect on the values embedded in them (the stories) as evidenced by Garti and Dolan (2014) when they assert that to better learn the values contained in stories, children like listening to the stories over and over again. 'Repetition', 'voice variation' 'body language', 'allowing learners' inputs should be used (Rahasya, 2017). In this line, Hayati et al. (2020, p.119) advise using 'several repetitions" but do not precise the number. However, Bayindir and Gökce (2022) caution that the repetitions should be well planned to avoid boring the audience (the learners in this case). In this study, during observations, it was found that only two teachers did read the stories twice; others read the stories once.

Moreover, when a story is told, it is better for the narrator/reader to highlight the meaning of the story by altering the voice, maintaining eye contact with the audience, adding pauses between events and using body language (Kanak &Onder, 2017). This way of teaching would help children better internalize the values embedded in the stories (SyahrainiTambak, 2016 cited in Mandira and Khoiriyah, 2022).

During observations, however, it was noted that only two teachers told the stories by varying their voices and adding some body languages with regard to the message conveyed in the story. For instance, in one observation of a teacher, as he was reading a story on '*Inyamaswa zo mu gasozi'* (translation: '*Wild animals'*), when he (the teacher) reached the sentence: "*Bukeyebwaho, Nyiramwezi ahamagara umukobwa we ati*" "*Kanyana Kanyana ngwuino ...*!" (Translation: *on the following day Nyiramwezi called her daughter: "Kanyana, kanyana, come...*!").

Here, to link the meaning and the storytelling technique, the teacher raised his voice while reading the words *'Kanyana, kanyana, come'* to mark the distance between the two characters which demands using a high voice so that one character can hear what another character is saying.

Furthermore, it is worth noting that children are actors in storytelling. Apart from being active listeners, they also participate in the telling of the story. Their participation depends mostly on the teacher telling the story. It is during this time of storytelling that "student participation should be promoted" by inviting them to individually or "collectively" imitate some actions, repeat some words or sentences in the story" (Zembat et al., 2013 cited in Kanak &Onder, 2017, p. 145).

During the interviews, a few teachers reported that, while telling stories, they allowed learners to participate by asking them to imitate some story characters using gestures. This was evident during observations when story telling took place; we observed only two teachers involving children in the storytelling process; others told the stories straightforward.

Step III: After storytelling**.** It was found that teachers allowed some few minutes for 'reflection' via dialogue and discussions. This is a good step to enable them (children) to internalise some values embedded in the story via scaffolding. In this regard, prior to storytelling, T6 reported that he asks the learners to be ready for this part after storytelling as follows:

> I tell the students that we shall compare their answers on the illustrations to the content of the story after listening to it. I also tell them that there will be other questions related to the whole story.

In the same line, T1 added:

> After telling the story to the children, I ask them about what they should do when they are in their villages and come across a child who is victimized by people. What shall you do? Will you pardon them?

This is in line with Schuitema et al. (2008, p.9) who support the use of dialogue and discussions, because, through dialogues children develop 'critical thinking and independence of mind.' We find this relevant since it allows children internalizing values after weighing their importance in their lives. We also agree that the mastery of various teaching techniques of storytelling makes the success of value education as evidenced by Rahiem et al. (2020) that the techniques the teacher uses to tell the stories play a great role in influencing the listeners (in this case children). Reflection on the story is essential because it shows whether children have fully understood the story or not (Schuitema et al. (2008). Thus, we assume that the values learnt in this way are subject to sustainability.

However, during observations, it was found that only a few teachers allowed this reflection part on values embedded in the story. Nonetheless, those who allowed reflection did not give it much time, and children were not given time to discuss in groups. Others used the teacher-centred method which conflicts with the constructivism mode of teaching and learning which CBC illuminates. On this point, T2 reported:

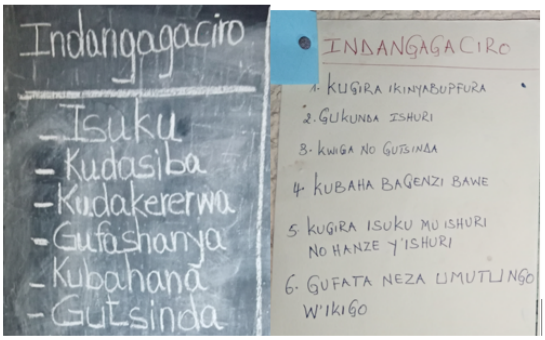
> You know, the story like the one entitled 'Inyamaswa zo mu gasozi' (translation: 'wild animals') is embedded with a value on 'environmental protection'. When I tell/read it to children I have to tell them about this environment protection value (…) I tell my students that the National Park is a good place for animals to live peacefully where they are even protected.

We are for the view that the teacher-centred method cannot benefit children, because, as Al-Zu'be (2013) expressed, it allows the teacher to monopolize the teaching and learning by "acting as a knowledge transmitter", which inhibits the growth of the learners in values embedded in stories.

Moreover, in this study, findings show that many teachers rely on indoctrination as a values education strategy. During interviews, many teachers confirmed that, instead of storytelling, they mostly use the morning assembly to inculcate values in children. For instance, in T8's words: "*During the morning assembly, we have to sensitize the children on environment protection by telling them not to step on gardens, not to kill birds, etc."*

Additionally, some other teachers said that the values that students must rely on are already in their classrooms hanged on the walls or written on the chalkboards as reported by teachers during interviews. For instance, T1 who teaches in primary 1 revealed: "*The P1 children come here without respecting each other. I have to tell them the values that should guide them. These values are written on the chalkboard*."

The researchers were taken to different classrooms to witness these values. During the tour, the researchers found themselves that the values for Primary one (P1) are: *isuku (cleanliness), kudasiba (regular attendance), kudakererwa (punctuality); gufashanya (helpfulness); kubahana (mutual respect); and gutsinda (hard work/success)*. The values for primary two (P2) are: *Kugira ikinyabupfura (respect/discipline); gukunda ishuri (studying); kwiga no gutsinda (hard work and success); kubaha bagenzi bawe (mutual respect); kugira isuku mw'ishuri no hanze ya ryo (cleanliness at school and elsewhere); gufata neza umutungo w'ikigo (protection of the school properties).*



Values P1 **Values P2**

Indoctrination is very criticized because it does not promote knowledge construction among the learners as Chaitanya (2017) clarified, indoctrination urges the learners to swallow predetermined knowledge (in this case values) without critical thinking.

Hence, we find it better to teach values in a competence-based mode via stories—the teacher should guide the students to discover the values and then help them to engage into dialogue /discussions about the very values to construct their own knowledge.

Conclusion and recommendations

This study has examined the teaching of values via storytelling in Rwanda lower primary school. All societies worldwide hail this crucial role of stories in fostering values to young people. Likewise, Rwanda lower primary school teachers recognize this crucial role in teaching values through stories. However, there are still challenges in the ways these values are taught in Rwanda lower primary school. Indoctrination is still dominating the teaching of values at this lower level of education. In this regard, CBC, which is implemented in Rwanda, encourages teachers to prioritize the constructivist teaching and learning which boosts the learners' critical thinking. Thus, there is a need for the teachers to overcome these challenges to better teach values.

Since stories constitute a valuable channel through which values are taught, teachers should be trained on how to use these stories in teaching values; they should also promote competence-based mode of teaching and learning values; and they should uplift values education to its level of key competence.

Future research could focus on the following aspects:

-Longitudinal study to find how values inform children's behaviours and how these behaviours are sustainable over a period of time.

- How stories contribute to values education through the lens of parents, school leaders as well as students.

This research adds value to the literature available on teaching values through stories. The results of this study could be used to inform education stakeholders on the gaps to be filled in and the awareness of some teachers who do not apply the CBC principles in the teaching and learning of values.

Conflict of interest: The authors declare no conflict of interest

Funding details: This study was not supported by any funding agency

CRediT Author Statement:
Author 1, author 2 and author 3 contributed to the conceptualization of the study.
Author 1 Methodology, Data collection, analysis, and writing
Author 2 and Author 3 contributed to the review and editing of the manuscript.

Ethical Statement: the study was conducted after securing permission from the University of Rwanda, College of Education.

References

Adie, E. U., & Ushie, A. D. (2018). Integrating African folklore into drama-in-education pedagogy for cultural development in Nigerian primary schools' curriculum. *Humanitatis Theoreticus Journal*, *1*(1).

Al-Somadi, M. M. F. (2012). The effect of a story-based programme on developing moral values at the kindergarten stage. *Interdisciplinary Journal of Contemporary Research in Business*, *4*(7), 535-559.

Al-Zu'be, A. F. M. (2013). The difference between the learner-centred approach and the teacher-centred approach in teaching English as a foreign language. *Educational research international*, *2*(2), 24-31.

Aroff, A. R. B. M. (2014). Values education and the Malaysia education blueprint. *Journal for Interdisciplinary Research in Education*, *4(1)*, 59-73.

Bada, S. O., & Olusegun, S. (2015). Constructivism learning theory: A paradigm for teaching and learning. *Journal of Research & Method in Education*, *5*(6), 66-70.

Balakrishnan, V., & Thambu, N. (2017). Using moral and ethical stories to inculcate values among preschoolers. *International Journal for Studies on Children, Women, Elderly and Disabled*, *2*(6), 8-15.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bayındır, N., & Gökce, M. (2021). Determining the Ways Primary School Teachers Follow During the Storytelling Process. *Journal of Primary Education*, 13, 6-12.

Bogdan, R. C., & Biklen, S. K. (2005). *Qualitative research in education: An introduction to theory and methods* (5th ed.). Boston, MA: Allyn& Bacon.

Chaitanya, M. (2017). Value based education and methods, strategies, approaches to impart it in education. *International Journal of Research Culture Society*, *1*(5), 6-10.

Chesin, G. A. (1966). Storytelling and storyreading. *Peabody Journal of Education*, *43*(4), 212-214.

Cishe, E. N. (2024). Effects of clicker-based literacy and storytelling learning strategy on performance of students in social studies. (10) 1, 2024, 46-57

Court, D., &Rosental, E. (2007). Values embodied in children's literature used in early childhood education in Israeli Stateschools. Early Childhood Education Journal, 34(6), 407-414.

Creswell, J. W. (2012). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.). Englewood Cliffs, NJ: Pearson.

Deniston-Trochta, G. (2003). The meaning of storytelling as pedagogy.*Visual Arts Research*, *24* (2), 103-108.

Durdukoca, S. F. (2019). Identifying the Attitudes and Views of Social Sciences Teachers toward Values Education in Turkey. *World Journal of Education*, *9*(1), 103-117.

Fang, Z. (1996). Illustrations, text, and the child reader: what are pictures in children's storybooks for? *Reading Horizons: A Journal of Literacy and Language Arts*, *37*(2), 130-142.

Garti, A., & Dolan, S. L. (2014). Children's Gamification and Storytelling as Tools for Understanding and Instilling Values: A Guide for Coaches, Educators and Parents in the Use of 'Value of Values' and 'Magic Carpet and the Islands of Values'. *ESADE Business School Research Paper*, (254), 1-13

Gunawardena, M., & Brown, B. (2021). Fostering values through authentic storytelling. *Australian Journal of Teacher Education*, *46*(6), 36-53.

Hayati, M., Lestari, M. D. W., &Nurmawahda, N. (2020). Kak Awam's Storytelling Strategy In Delivering Moral Values For Children. *Journal of Early Childhood Education*, *2*(2), 113-124.

Isbell, R., Sobol, J., Lindauer, L., & Lowrance, A. (2004). The effects of storytelling and story reading on the oral language complexity and story comprehension of young children. *Early childhood education journal*, *32(5)*, 157-163.

Jackson, C., Vaughan, D. R., & Brown, L. (2018). Discovering lived experiences through descriptive phenomenology. *International Journal of Contemporary Hospitality Management*, *30*(11), 3309-3325.

Kalina, C., & Powell, K. C. (2009). Cognitive and social constructivism: Developing tools for an effective classroom. *Education*, *130*(2), 241-250.

Kanak, M. Ö. M., & Onder, M. (2017). Teaching values with stories and tales in the preschool period. *Journal of Education and Practice*, *8(30)*, 143-149.

Kasapoglu, H. (2015). Students opinions about the effect of value-themed short stories used in education. *Educational Research and Reviews*, *10*(13), 1781-1788.

León G.R. & Castañeda P. H. (2018). Exploring Social Skills and Character Education of Students Through Storytelling in L2. *GIST–Education and Learning Research Journal*, (17), 128-157.

Lucarevschi, C. R. (2016). The role of storytelling on language learning: A literature review. *Working Papers of the Linguistics Circle*, *26*(1), 24-44.

Mandira, G., &Khoiriyah, K. (2022). Analysis of storytelling style to early childhood. *Journal ILMI*, *11*(1), 64-69.

Maphalala, M. C., & Mpofu, N. (2018). Embedding values in the South African curriculum: by design or default. *South African Journal of Education*, *38*(3), 1-11.

Mapp, T. (2008). Understanding phenomenology: The lived experience. *British Journal of Midwifery*, *16*(5), 308-311.

Molenda, C. F., & Bhavnagri, N. P. (2009). Cooperation through movement education and children's literature. *Early Childhood Education Journal*, *37(2)*, 153-159.

Mulenga, I. M., & Kabombwe, Y. M. (2019). A competence-based curriculum for Zambian primary and secondary schools: Learning from theory and some countries around the world. *International Journal of Education and Research,* (7)2, 117-130

Newell, F. M. (1995). Sharing multicultural literature through storytelling. *Reading Horizons: A Journal of Literacy and Language Arts*, *35*(5), 423-429.

Ngamije, J. (2021). Post-Genocide opportunities and character education through the eyes of youth at risk of drugs use in Rwandan Schools: the great paradox? *Available at SSRN 3802403*.

Patton, M. Q. (2002). Qualitative research and evaluation methods (3rd ed.). Thousand Oaks, CA: Sage.

Piaget, J. (1951). *Play, dreams and imitation in childhood*. London: Heinemann.

Piaget, J. (1999). *The moral judgment of the child*. New York: Routledge Press.

Rahasya, M. K. (2017). Teaching good character in a narrative text through storytelling. *Journal of English and Education*, *5*(2), 145-153.

Rahim, H., & Rahiem, M. D. H. (2012). The use of stories as moral education for young children. *International Journal of Social Science and Humanity*, *2*(6), 454.

Rahiem, M.D.H., Abdullah N.S.M, Krauss S.E. (2017) Kindergarten Teachers and Moral Education for Young Children: Why Do Narratives Matter? *ASSEHR* (58), 301-306.

Rahiem, M. D. H., Abdullah, N. S. M., & Rahim, H. (2020). Stories and Storytelling for Moral Education: Kindergarten Teachers' Best Practices. *Journal of Early Childhood Education*, 2(1), 1–20.

REB (2015). *Competence Based Curriculum*. Kigali: REB.

Şahin, B. (2021). The development of values education in the Turkish high school geography curriculum. *Review of International Geographical Education Online*, *11*(2), 574-605.

Schaper, B. (2013). The importance of the literary title and its implications for translation theory. *Focus on German Studies*, (*20*), 101-113

Schuitema, J., Dam, G. T., & Veugelers, W. (2008). Teaching strategies for moral education: A review. *Journal of curriculum studies*, *40*(1), 69-89.

Setiawan, D., & Aisyah, S. (2016). Scaffolding in kindergarten block activities based on constructivism (research and development on scaffolding model for block activities in kindergarten). *Indonesian Journal of Early Childhood Education Studies*, *5*(2), 82-88.

Sidhartani, S. (2019). Visual Language as the Storytelling and Imaginative Aspects in the Illustrated Children's Storybook. *American Research Journal of Humanities Social Science*, 2 (2) 14-21.

Sim, H.H. (2004) Storytelling for Social Studies in the Primary Classroom, Humanities and Social Studies Education, 25(2), 139-148.

Souza, A. S., & Oberauer, K. (2022). Promoting visual long-term memories: When do we learn from repetitions of visuospatial arrays*? Journal of Experimental Psychology: General*, 151(12), 3114-3133.

Tappan, M.B., & Brown, L.M. (1989). Stories told and lessons learned: Toward a narrative approach to moral development and moral education. *Harvard Educational Review*, *59* (2), 182-205.

Uhrmacher, P. B., Conrad, B. M., & Moroye, C. M. (2013). Finding the balance between process and product through perceptual lesson planning. *Teachers College Record*, *115*(7), 1-27.

Vinyo, I. Y., Yekple, S. L. K., & Adade, D. A. (2021). Traditional Ewe Folktale: A behaviour modification strategy in the Early Grade Education classrooms in Ghana. *Journal of Education and Practice*, *5*(4), 1-22.

Vitz, P. (1990). The use of stories in Moral Development. New psychological reasons for an old Educational model. *American Psychologist*, *45*, 709-720.

Wehmeier, C., & Rafat-Saleh, M. (2025). Heritage-Based Storytelling and Narratives: the Added Value of Engagement in Placemaking and Heritage Communication. *Trilogy Dynamics of Placemaking*, 158.

Willson, A., Falcon, L., & Martinez, M. (2014). Second Graders' Interpretation of Character in Picturebook Illustrations. *Reading Horizons: A Journal of Literacy and Language Arts*, *53*(2), 40-61.

Yoo, S. Y. (1997). Children's literature for developing good readers and writers in kindergarten. *Education*, *118*(1), 123-130.