

Effect of Learner-Centered Approach Application on Learning Outcomes in Secondary School at Advanced Level: A Case of Rulindo District, Rwanda (2021-2023)

Silas Mbonimana¹
Dr. Cyprien Sikubwabo²

¹smbonimana@gmail.com (+250788788410)

²cyprianov@gmail.com (+250788331063)

¹University of Kigali, Musanze, Rwanda, ²School of Education, University of Kigali, Kigali Independent University ULK, Rwanda

ABSTRACT

This study explores the effect of applying a learner-centered approach on learning outcomes in secondary schools at the advanced level in Rwanda. The aim of this research is to examine whether the implementation of a learner-centered approach leads to improved learning outcomes in Rwanda's secondary schools. This study used mixed-methods research involving quantitative and qualitative methods. The target population consisted of 141 individuals, including 87 teachers and other school leaders, located in 17 sectors of Rulindo District. The researcher employed cluster sampling for school selection. Questionnaires, interview guides, and documentation reviews were used to collect relevant data. Cronbach's alpha was 0.892, which is above 0.7 in this study. This indicates that the scale has a high degree of internal consistency. The interpretation touched on means, standard deviation, and regression analysis, which are complementary to the results from the interview. The findings revealed that the application of a learner-centered approach has a significant effect on learning outcomes. This is obvious when we look at the beta and p-value for learner-centered approach application dimensions such as active learning, cooperative learning, and inductive teaching learning linked to the objectives of this study. The variables' p and β values are as follows: active learning ($\beta=0.777$, p value <0.05); cooperative learning ($\beta=0.208$, p value <0.05); and inductive teaching learning ($\beta=0.037$, p value >0.05). To make the learner-centered approach very successful, Rwanda's government, stakeholders, school leaders, and parents should make more efforts to address issues related to the learner-centered approach application from which students come.

Keywords: Active Learning, Cooperative Learning, Inductive Teaching, Learner-Centered Approach, Learning, Learning Outcomes

I. INTRODUCTION

This paper consists of a literature review, research methodology, research findings, conclusion, and recommendations concerning the learner-centered approach to learning outcomes in secondary schools. The learner-centered teaching method is an approach that places students at the center of the learning process and supports them in developing skills such as critical thinking, problem solving, and collaboration. The Organization for Economic Cooperation and Development (OECD, 2020) conducted a study that revealed that countries that prioritize learner-centered teaching methods tend to outperform traditional teaching methods in academic achievement. The study found that countries such as Finland, Japan, and South Korea, which prioritize learner-centered approaches in their education systems, consistently rank among the top performers in international assessments of student achievement. Furthermore, the World Bank's report demonstrates that learner-centered teaching methods enhance student engagement and motivation, decrease dropout rates, and boost student retention. The report also found that these methods possess the possibility of promoting social inclusion and equity and can be especially effective for disadvantaged students. Overall, the globally learner-centered method of teaching is an effective approach that can benefit students, teachers, and the community in general (World Bank, 2021).

Constructivists postulate that humans are perceivers and interpreters who construct meaning from new and prior experiences. Instructional design should therefore focus on providing tools and environments for helping learners interpret the multiple perspectives of the world while creating their own world (OECD, 2020).

Learning outcomes provide clear expectations for the student and outline how they will achieve these goals as a means of participating in the learning process. Learning outcomes are one of the most essential sections of the course and program, tracing the essence of the course and the student-centered approach. By

reading the enumerated learning outcomes, a boss or professional in the field must be able to recognize what knowledge, skills, and attitudes the learners will acquire after taking the course.

According to Yildirim (2018), "learner-centered methods have played a great role in all countries based on their educational systems, especially in sub-Saharan Africa, for more than two decades." The replacement of the educational system with emerging e-learning has led to many controversies as stakeholders argue about the most efficient and effective approaches (Al-Zu'be, 2013). While, teacher-centered method is a method which illustrate students non-aggressive while facilitators are aggressive since facilitators are the center in this method that is compared sensible since the facilitators are familiar with the language that the students are not. Thus, these activity learners don't participate fully during teaching-learning activities (Al-Zu'be, 2013).

In Africa, the learner-centered teaching approach is an important procedure that is becoming increasingly popular in many countries across the continent. The Education Support Program (ESP) in West Africa conducted a study that demonstrated the effectiveness of learner-centered approaches in improving education outcomes, increasing student retention, and enhancing the transfer of knowledge and skills to real-life situations. According to a recent report by the African Development Bank, the use of technology in African classrooms has increased significantly over the past few years, with several countries implementing large-scale technology-enabled learning initiatives. Overall, learner-centered teaching is an important teaching method in Africa that helps to improve education outcomes and equip learners with the skills they possess to succeed in the modern world (World Bank, 2021).

The United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2017) conducted a study revealing that learner-centered education remains a relatively new concept in many African countries, despite some notable examples of successful implementation. For instance, Uganda's government has implemented the Quality Assurance and Standards for Education (QASSE) program, emphasizing learner-centered approaches to teaching and learning. Rwanda provides another example, emphasizing the importance of learner-centered education in its national education policy.

Furthermore, a report by the African Union Commission (AUC, 2018) notes that a number of initiatives are underway to promote learner-centered education in Africa, including teacher training programs and the evolution of new curricula and learning materials. In terms of statistical data, a 2019 report by the World Bank (2020) indicates that many African countries still struggle to provide quality education to their citizens. Despite the ongoing efforts to fully implement and scale learner-centered education in Africa, there are promising initiatives and successful examples across the continent.

To improve the quality of education, Rwanda has adopted a learner-centered approach to teaching as a component of its education reform program. According to UNESCO (2018), Rwanda has made significant progress in expanding access to education, with a net enrollment rate of 97% at the primary level and 44.7% at the secondary level. However, the quality of education has been a concern, with low completion rates and poor learning outcomes. To address this, the government of Rwanda has implemented a competency-based curriculum that prioritizes a learner-centered approach. In Rwanda, the impact of a learner-centered approach has been positive, with improved learning outcomes and increased learner commitment. According to the report by the Ministry of Education, Rwanda (2021), the pass rate for the national high school exams increased from 71.1% in 2016 to 83.3 in 2020, with a significant improvement in science subjects. The report also indicated that learners who participated in hands-on activities performed better than those who did not. In conclusion, learner-centered teaching in Rwanda has been successful in improving the quality of education and contributing to the country's development goals. However, further efforts are necessary to guarantee universal access to high-quality education, particularly for students residing in rural areas.

A long time ago, the Rwandan educational system, as well as other countries' educational systems, used traditional methods when teaching their learners. Traditional education centralized teachers in the teaching and learning process, while students learned passively due to their perceived ignorance (OECD, 2020). According to Barkley et al. (2014), the learner-centered method prioritizes students' interests and recognizes their voice as essential to the learning experience. In a student-centered classroom, learners select what they will discover, how they will discover it, and how they will judge their own learning, with the teacher acting as a facilitator rather than an instructor. In essence, the facilitator's objective in the learning process is to lead learners into making new interpretations of the learning material, thereby "experiencing" content, asserting Rogers' notion that "significant learning is getting through doing." Teachers can improve the quality of their teaching by observing others (Fernandez et al., 2003). This is a system where teachers observe

one another in class and give feedback after the lesson has ended. Compared to evaluative observation, which typically involves school administrators, inspectors, education officers, and other government officials, teachers find this approach more comfortable (World Bank, 2021). According to the 2019 Rwanda Education Statistics Annual Report, approximately 71.8% of secondary school teachers in Rwanda use teacher-centered approaches, while only 28.2% use learner-centered approaches in their teaching. The report also emphasizes the need to shift towards learner-centered approaches in the Rwandan education system to improve the quality of education and empower students to become active and engaged learners. It's essential to note that these figures are from 2019 and may have changed since then.

Based on all those challenges, researchers raised the idea of using a student-centered approach as a major way to handle the problem of low levels of understanding and poor performance. Not only do these challenges, but also those rooted in the Rwandan educational system, clearly demonstrate the inefficacy of teacher-centered methods that encourage passive and superficial learning, portraying learners as inactive individuals. The World Bank (2021) has focused on various applicable methods, such as free discussion, group work, challenge-based learning, problem-based learning, and role play, to enhance student engagement and improve learning outcomes. The study shall provide research assistance by locating and analyzing primary and secondary data, organizing the data output, and creating comprehensive reports. This will enable the researcher to have a better appreciation for the findings and provide meaningful recommendations for policy change. Additionally, we have proposed a literature review of existing research studies on the topic to provide a foundation for this research.

The available literature confirms that the application of a learner-centered approach could produce positive outcomes in the teaching-learning process. The studies suggest that creating a charismatic classroom mood provides expressive learning experiences for independent learners (Akyol, 2019). A student-centered approach encourages learners to take ownership of their learning experiences, leading to positive learning outcomes, including improved motivation, increased critical thinking and problem-solving skills, enhanced engagement, and ultimately, higher academic achievement. While there have been some studies conducted on the effect of teacher-centered approaches in primary schools in Rwanda, there is less research on the effect of this approach in secondary schools. Furthermore, most of the studies have focused on a small number of subject areas, such as mathematics and science, leaving gaps in knowledge regarding the impact of these approaches in other subject areas. Overall, while there is some research on the effectiveness of student-centered approaches in secondary schools in Rwanda, more studies are required to complete the gaps in knowledge on this subject and provide a more comprehensive understanding of its impact. This demonstrated that there was not sufficient research on these issues; the gap is wide in this area of study. This is the reason the researcher set out to examine the effect of a learner-centered approach on learning outcomes in secondary schools at an advanced level.

II. LITERATURE REVIEW

1.1 Objectives of the Study

- i. To examine the effect of active learning on Learning outcomes in Rulindo district secondary schools
- ii. To examine the effect of cooperative learning on Learning outcomes in Rulindo district secondary schools
- iii. To examine the effect of inductive teaching learning on Learning outcomes in Rulindo district secondary schools

1.2 Hypotheses

H₀₁: There is no significant effect of active learning on learning outcomes in Rulindo district secondary schools

H₀₂: There is no significant effect of cooperative learning on learning outcomes in Rulindo district secondary schools

H₀₃: There is no significant effect of inductive teaching learning on learning outcomes in Rulindo district secondary schools

2.1 Active Learning and Learning Outcomes in Secondary School

Active learning technology demands learners go beyond their learning by thinking, discussing, investigating, and creating. Researchers in education demonstrate that incorporating active learning techniques into university courses significantly boosts learner learning experiences (Freeman et al., 2014; Theobald et al., 2020).

For example, a study by Ntuyabaliwe and Rutarohereza (2018) found that active learning led to significant improvements in academic achievement and critical thinking skills among secondary school students in Rwanda. The study involved the use of interactive teaching techniques such as group discussions, role-playing, and problem solving.

According to research by Manzi and Nkuyubwatsi (2017), the usage of active learning approaches such as collaborative learning, problem-based learning, and technology-enhanced learning in secondary schools in Rwanda significantly enhanced students' academic performance and engagement.

Another study by Beatty and Lienhardt (2019) found that those active learning approaches, particularly collaborative and project-based learning, increased students' knowledge and skill acquisition, engagement, and motivation. This study also revealed that teachers who used active learning techniques had a greater ability to state and address students' individual learning needs.

According to Deslauriers et al. (2019), active learning strategies such as brainstorming, discussions, and group work had a positive effect on student motivation, engagement, and performance.

In addition, a study by Parmelee and Michaelsen (2020) found that active learning techniques such as peer teaching and group projects improved critical thinking skills and academic performance in mathematics among secondary school students in Rwanda.

Overall, there is sufficient evidence to suggest that active learning is an effective way to increase learning outcomes in secondary schools in Rwanda. By allowing learners to participate actively through group discussions, hands-on activities, and problem-solving tasks, they are more likely to retain information, develop critical thinking skills, and stay motivated throughout the learning process. These studies also suggest that integrating active learning techniques can lead to improved learning outcomes for secondary school learners in Rwanda and other African countries.

2.2 Cooperative Learning and Learning Outcomes in Secondary Schools

Cooperative learning is a teaching methodology that involves learners working in small groups to achieve shared learning objectives. Numerous studies have shown that cooperative learning can have a positive effect on learning outcomes in secondary schools. In cooperative learning, learners work together in small groups on a structured activity. It was introduced into American classrooms in the early twentieth century by Sauviy (2019), who saw experience and education as being closely linked and believed that people needed extensive experience in cooperation to function successfully in groups. Cooperative learning is characterized by positive interdependence, where students perceive that better performance by individuals produces better performance by the whole group (Johnson et al., 2014).

Furthermore, research has suggested that it can promote positive intergroup relations and reduce prejudice and stereotypes among students from diverse backgrounds (Johnson et al., 2014). This can lead to more inclusive classrooms and school communities, which can improve the overall learning climate for all students.

In the Rwandan context, a study conducted by Kamanzi and Nsengiyumva (2018) suggested that it had a significant positive effect on the school performance of secondary school students in social studies. Another study by Gillies (2007) assessed the impacts of cooperative learning on students' academic performance in secondary schools in Rwanda. The results showed a significant improvement in students' academic achievement. Another study by Ahn (2010) found cooperative learning to have positively influenced students' academic performance, increased students' participation, and enhanced learning outcomes. These findings were consistent with previous research that has shown cooperative learning to be an effective teaching strategy.

Cooperative learning has been found to enhance students' ability to work collaboratively, and learners' participation in classroom discussions increases. By working collaboratively in cooperative learning groups, learners can share expertise and sit in circles to solve problems, improving their learning outcomes.

Overall, the use of cooperative learning in secondary schools in Rwanda has demonstrated that there is high academic achievement and a rise student engagement and motivation. And also, the evidence suggests

that it can be an effective teaching strategy for increasing learning outcomes in secondary schools. By working together in groups, learners can develop a range of skills and competencies that can prepare them for success in higher education and the workforce.

2.3 Inductive Teaching-Learning and Learning Outcomes in Secondary School

Inductive teaching-learning is an approach to instruction that involves presenting specific examples or cases to learners and guiding them to derive general principles or concepts from these examples. In other words, it encourages students to infer or create general rules or principles on their own rather than being told what they are. Researchers have found that inductive teaching and learning can be highly effective in improving learning outcomes in secondary schools. For example, one study found that when high school students were taught using inductive methods, they had a better understanding of the content and were able to put it into practice more effectively than students who were taught using deductive methods (Ozguner, 2019). Another study found that inductive teaching and learning were particularly effective in promoting judgment in secondary school students.

Moreover, inductive teaching and learning, which involves promoting learning through the use of examples and problem solving, has also been found to have better learning outcomes in secondary schools in Rwanda.

Several studies have demonstrated that inductive teaching can be effective in promoting learning outcomes. A study conducted by the REB (2020) and Markovits and Lindell (2018) found that inductive teaching methods were better than ex-cathedra teaching approaches in promoting knowledge retention and conceptualization among secondary school students. Another study published in the *Journal of Education and Practice* (2016) found that inductive teaching approaches were effective in improving students' reading comprehension and understanding skills in English language learning contexts. The study also found that students who learned through an inductive approach were more motivated and interested in the learning procedure.

In addition, a study by Ntukamazina et al. (2016) found that the application of inductive teaching methods in a secondary school in Rwanda led to improved learning outcomes for students. Another study by Mushimiyimana (2019) explored the efficiency of inductive teaching strategies on students' learning outcomes in a science class in Rwanda. The results showed that the application of inductive methods improved students' understanding of the concepts taught, as well as their problem-solving and critical thinking skills.

There are several reasons why inductive teaching and learning are effective. First, it engages learners in active learning, which leads to enhanced learning outcomes. Second, it encourages learners to think critically and to develop problem-solving skills, which are essential for success in many areas of life. Finally, it allows learners to create their own knowledge and to raise their level of understanding of the content. The use of inductive teaching and learning in secondary schools at an advanced level in Rwanda is a positive step towards improving learning outcomes. Teachers are encouraged to build this approach into their teaching methodologies to help students achieve better academic performance.

III. METHODOLOGY

3.1 Research Design

According to Creswell (2014), research design refers to the general plan or structure of a research project and includes all the strategies that a researcher will employ to address the research problem." Descriptive research design and interviews were very useful for investigating the effect of a learner-centered approach on learning outcomes in Rwandan secondary schools. A sample was taken from some schools in Rulindo districts, and the respondents were the teachers, head teachers, and director in charge of studies. Mixed research techniques were used to obtain full information about the problems. Qualitative research is a research approach that generates data through open-ended interviews, observation, document analysis, or other non-quantitative methods to understand social phenomena, human behavior, and attitudes.

Qualitative methods are used for administrative staff only because of the information that they have; a researcher decides to talk to them in person through an interview, while quantitative methods are used for teachers, whose information is very direct depending on the questionnaire (Creswell, 2014). Quantitative research is a research approach that uses numerical data and statistical methods to examine empirical relationships, patterns, or cause-and-effect relationships between variables. Quantitative research employs

structured questionnaires, surveys, experiments, or other standardized methods to collect data, which can be analyzed using various methods, including correlation, regression, ANOVA, or hypothesis testing (Neuman, 2014). Qualitative research is generally considered more objective and generalizable than quantitative research due to its ability to produce measurable, quantitative data. The quantitative research approach involved the questionnaires to be filled out by teachers, whose information was very direct depending on the questionnaire (Bryman, 2016).

3.2 Population

The study population is a category of people from which a sample will be taken. The population designed for this study includes head teachers, directors in charge of studies, teachers, and discipline masters because they have relevant information that can be used to find good results on the problems. The target population was from all advanced secondary schools located in 17 sectors of Rulindo District. The total target population was 141 people, of whom 87 were teachers and others were school leaders. In this research, a researcher chose to use both probability and non-probability samplings. Through this research, purposive sampling was used to select head teachers and directors in charge of studies since these respondents had specific information. Random sampling was used for selecting the teachers based on their large numbers. A sample has been used to select the schools from all 17 sectors located in Rulindo District. In school selection, the researcher used cluster sampling. Studying in all schools in all sectors is not easy, and accessibility can be difficult. For calculating a sample size, research utilized stratified random sampling to find the sample size, where we have two strata: school leaders and teachers. In all target populations, the researcher found 141 people among them, including 87 teachers, 27 head teachers, and 27 directors in charge of studies.

The formula proposed by Taro Yamane (Yamane, 1973) was used to calculate the sample size which states that:

$$n = \frac{N}{1 + N(e)^2}$$

Where n: sample size

N= population

e=precision, always it is equal to 0.08

$$n = \frac{87}{1 + 87(0.08)^2} = \frac{87}{1.55} = 56 \cdot 1 \approx 56$$

This sample size calculation above was the teachers only, so 27 directors of studies, 27 head teachers had all considered as the number of respondents by using interview used Census Technique.

3.3 Measures

In order to obtain a wide range of information for the purpose of the study, three methods of data collection were used: questionnaires, interview guides, and documentation. Questionnaires were used to collect data from teachers and were made of close-ended questions in the form of Likert scales (disagree strongly = [1] = very low mean; disagree = [1-2] = low mean; neutral = [2-3] = moderate mean; agree = [3-4] = high mean; strongly agree = [4-5] = very high mean). The Internet is used as one of the most useful documents, mainly during the collection of other authors' views in a literature review about how learner-centered approaches are effective when used at school, especially at the advanced level. A competency-based curriculum framework syllabus was also used as a source of information about the effectiveness of the learner-centered approach. Various comments from head teachers, deputy dean of studies, and teachers about how a learner-centered approach is effective when applied in teaching and learning procedures form a great source of information to be based on in this study. Everybody was responding individually in a secret way.

For testing the reliability of instruments, the researcher used Cronbach alpha, or SPSS, a statistical measure of reliability commonly used in testing and assessment. It ranges from 0 to 1, with higher values indicating greater internal consistency.

The closer the value approaches 1.0, the more consistent a test is and the freer the error of variance, as Cronbach's alpha above 0.7 is considered satisfactory.

Table 1*Reliability Results*

Variables	Items	Cronbach's Alpha	Comments
Active learning	32	0.833	Satisfactory
Cooperative learning	32	0.804	Satisfactory
Inductive teaching-learning	32	0.898	Satisfactory
Overall		0.892	Satisfactory

As shown in Table 1, the overall calculated Cronbach's alpha was 0.892, which is above 0.7. This indicates that the scale has a high degree of internal consistency, meaning that the items are measuring the same construct consistently, which is known as "Effect of learner-centered approach application on learning outcomes in secondary schools at advanced level in Rulindo district." This value of 0.892 indicates that the scale has a high level of homogeneity. A high level of homogeneity suggests that the items are measuring the same aspect of the construct, enhancing the validity of the scale.

IV. FINDINGS & DISCUSSIONS**4.1 Response Rate**

This section focuses on the presentation, analysis, and interpretation of data collected by means of observation, questionnaires, and interviews. Data analysis and interpretation were mostly based on the statement of the problem, the research question, and the research objectives of the study. The data was collected on the effects of active learning, cooperative learning, and inductive teaching to find out how those techniques help teachers teach students in an effective and efficient way. The data was collected through questionnaires from 56 teachers selected randomly among advanced secondary schools.

4.1.1 Demographic Characteristics of Respondent

A demographic profile has been used by the researcher to identify the appropriateness of respondents in terms of gender, age, marital status, education level, professional experience, and position. This information was used by the research in order to recognize the rate at which respondents appreciated the study, and it was used to interpret the information given by everyone.

4.2 Descriptive Statistics of Learner-Centered Approach on Learning Outcomes in Secondary Schools**4.2.1 Effect of Active Learning on Learning Outcomes in Rulindo District Secondary Schools**

The respondents provide the following answers to the statement given about active learning; descriptive statistics of their answers are presented in the Table 2 below. This was done on a 5-point Likert scale where: 1=Disagree strongly [Very low mean], 2= Disagree= [Low mean]; 3=Neutral= [Moderate mean]; 4=Agree [High mean]; 5=Strongly Agree [Very high mean].

Table 2*Descriptive Statistics for Active Learning on Learning Outcomes*

Statements	N	Min	Max	Mean	Std. Dev.
The teacher incorporates active learning strategies (such as group work or interactive activities) into their lessons	56	3.00	5.00	3.8750	.74009
The teacher is effectively at providing guidance and feedback on the active learning activities	56	3.00	5.00	4.0893	.64036
There is a change in the learning outcomes since participating in active learning exercises	56	3.00	5.00	3.9286	.75936
Active learning approach is used to enhance the student's participation and attendance in class	56	3.00	5.00	4.1786	.78872
In active learning, the students are given the chance to solve problem or think critically through active participation in learning activities	56	3.00	5.00	4.2321	.63220
Active learning methods, such as peer teaching and collaborative learning are used to fully involve learners	56	3.00	5.00	4.1607	.59625
Overall	56			4.2321	0.78872

The results in Table 2 show that the majority of the respondents strongly agreed that active learning has a positive effect on learning outcomes in Rulindo district schools. The results from four variables indicated that the respondents agreed that there is an effect of active learning on learning outcomes with a very high mean. These are the following: the teacher is effectively at providing guidance and feedback on the active learning activities ($\mu=4.0893$ and $STD=0.64036$), the active learning approach is used to enhance the student's participation and attendance in class ($\mu=4.1786$ and $STD=0.78872$), In active learning, the students are given the chance to solve problems or think critically through active participation in learning activities ($\mu = 4.2321$ and $STD = 0.63220$). Active learning methods, such as peer teaching and collaborative learning, are used to fully involve learners ($\mu = 4.1607$ and $STD = 0.59625$).

The results also indicated that in the in the remaining two variables, the respondents agreed that: the teacher incorporates active learning strategies (such as group work or interactive activities) into their lessons ($\mu = 3.8750$ and $STD = 0.74009$); there has been a change in the learning outcomes since participating in active learning exercises ($\mu = 3.9286$ and $STD = 0.75936$). This showed that the respondents accepted at a high level. The results from this table show that the overall mean of agreement is very high ($\mu=4.2321$, **very high mean**), and the overall standard deviation is ($STD=0.78872$). This very high mean indicates a positive effect of active learning and learning outcomes in secondary schools in Rulindo district.

The above findings are similar to the findings by Deslaurien et al. (2019), who found that active learning activities like flipped classroom, case studies, and simulation keep students actively involved, boosting their interest and motivation to learn. According to Lang (2016), when students grapple with concepts through active learning, they process information more deeply and retain it better compared to passive listening. Also in the study by Gupta and Bhagat (2020), active learning strategies often involve critical thinking and problem-solving skills as students analyze, interpret, and apply knowledge to real-world scenarios.

4.2.2 Effect of Cooperative Learning on Learning Outcomes in Rulindo District Secondary Schools

The respondents provide the following answers to the statement given about cooperative learning as presented in the table3 below.

Table 3

Descriptive Statistics on Cooperative Learning on Learning Outcomes

Statements	N	Min	Max	Mean	Std. Dev.
Cooperative learning is frequently applied to increase students' academic performance	56	3.00	5.00	3.8214	.76532
Students are fully engaged and motivated through cooperative learning.	56	3.00	5.00	4.0714	.59870
Learners who participated in cooperative learning groups scoring higher on tests compared to those who did not participate.	56	3.00	5.00	3.9107	.74533
Inclusiveness is demonstrated through cooperative learning in for creating conducive environment for all learners	56	3.00	5.00	3.9464	.79589
All students contribute equally in learning activities provided through cooperative learning.	56	3.00	5.00	4.2500	.57997
Applicability of knowledge and skills acquired in real life is strengthened through cooperative learning.	56	3.00	5.00	4.1429	.58554
Overall	56			4.2500	4.2500

The results from Table 3 indicated that the majority of respondents strongly agree that cooperative learning has an effect on learning outcomes in secondary schools. The following variables showed that cooperative learning promotes learning outcomes in secondary schools at a very high mean: Students are fully engaged and motivated through cooperative learning ($\mu=4.0714$ and $STD=0.59870$), all students contribute equally to learning activities provided through cooperative learning ($\mu=4.2500$ and $STD=0.57997$), and the applicability of knowledge and skills acquired in real life is strengthened through cooperative learning ($\mu=4.1429$ and $STD=0.58554$).

The results also showed that for the remaining three variables, the respondents agreed: Cooperative learning is frequently applied to increase students' academic performance ($\mu = 3.8214$ and $STD = 0.76532$), learners who participated in cooperative learning groups scored higher on tests compared to those who did not ($\mu = 3.9107$ and $STD = 0.74533$), and inclusiveness is demonstrated through cooperative learning for creating

a conducive environment for all learners ($\mu = 3.9464$ and $STD = 0.79589$). This showed that the respondents accepted at a high level. The results from this table show that the overall mean of agreement is very high ($\mu=4.2500$, **very high mean**), and the overall standard deviation is ($STD=0.79589$). This very high mean indicates a positive effect of cooperative learning and learning outcomes in secondary schools in Rulindo district.

Overall, the results in Table 3 indicated that four respondents confirmed that learners' academic achievement was at a very high mean, and two respondents confirmed a high mean.

The above findings are similar to those found in the study by Slavin (2018), who found that cooperative learning activities necessitate interaction, negotiation, and conflict resolution. As students work together, they develop valuable social skills like communication, collaboration, and teamwork. According to Ahn (2016), explaining concepts to peers and actively participating in discussions lead to a deeper processing of information. This collaborative effort enhances understanding and promotes longer-term knowledge retention compared to passive learning.

4.2.3 Effect of Inductive Teaching-Learning on Learning Outcomes in Rulindo District Secondary Schools

The respondents provide the following answers to the statement given about inductive teaching-learning as shown in Table 4 below.

Table4

Descriptive Statistics of Inductive Teaching Learning on Learning Outcomes

Statements	N	Min	Max	Mean	Std. Dev.
Inductive teaching-learning speeds students to infer or discover general rules or principles on their own, rather than being told what they are	56	3.00	5.00	3.8036	.74881
Inductive teaching-learning was particularly effective in promoting critical thinking skills in secondary school students	56	3.00	5.00	4.0714	.56752
Inductive teaching-learning facilitates students to develop problem-solving skills, which are essential for success in many areas of life	56	3.00	5.00	3.9821	.72591
In inductive teaching methods, the teacher accesses from simple to complex	56	3.00	5.00	3.8750	.76426
Inductive teaching and learning involves to upgrade learning through the use of examples and problem solving which has also been found to have a positive effect on learning outcomes in secondary schools	56	3.00	5.00	4.1964	.55333
Students who received inductive instruction showed better performance on a post-test compared to those who received traditional lecture-based instruction	56	3.00	5.00	4.0893	.61131
Overall	56			4.1964	0.76426

The results in Table 4 showed that the majority of respondents strongly agree that inductive teaching and learning have an effect on learning outcomes in secondary schools. The following variables showed that inductive teaching-learning raised learning outcomes in secondary schools at a very high mean: Inductive teaching-learning was particularly effective in promoting critical thinking skills in secondary school students ($\mu=4.0714$ and $STD=0.56752$). Inductive teaching-learning involves upgrading learning through the use of examples and problem solving, which has also been found to have a positive effect on learning outcomes in secondary schools ($\mu=4.1964$ and $STD=0.55333$). Students who received inductive instruction showed better performance on a post-test compared to those who received traditional lecture-based instruction ($\mu=4.0893$ and $STD=0.61131$).

The results also showed that for the remaining three variables, the respondents agreed: Inductive teaching-learning speeds students to infer or discover general rules or principles on their own, rather than being told what they are ($\mu = 3.8036$ and $STD = 0.74881$). Inductive teaching-learning facilitates students to challenge and develop problem-solving skills, which are essential for success in many areas of life ($\mu = 3.9821$ and $STD = 0.72591$). In inductive teaching methods, the teacher progresses from simple to complex ($\mu = 3.8750$ and $STD = 0.76426$). The results from this table show that the overall mean of agreement is very high ($\mu=4.1964$, **very high mean**), and the overall standard deviation is ($STD=0.76426$). This very high mean indicates a positive effect of inductive teaching-learning and learning outcomes in secondary schools in Rulindo district.

The above findings are aligned with the findings in the study by Ainsworth et al. (2018), who found that inductive teaching emphasizes student observation and analysis of real-world data, case studies, or phenomena. This could involve activities like analyzing experiments, interpreting graphs, or dissecting primary sources. According to Kuhn (2020), by actively engaging with the presented data, students begin to identify patterns and relationships. This encourages them to develop hypotheses and explanations for their observations, fostering critical thinking and problem solving.

4.2.4 Learners' Academic Achievement

The respondent provides the following answers to the statement given about learners' academic achievement as shown in table 5 below.

Table 5

Descriptive Statistics on Learners' Academic Achievement

Statements	N	Min	Max	Mean	Std. Dev.
In the last five years the learners' academic performance for this school has been good in national exams	56	3.00	5.00	3.9107	.74533
In the last five years the learners' academic performance for this school has been good in comprehensive assessments structured by NESA at the end of third term.	56	3.00	5.00	4.0179	.61765
In the last five years the learners' academic performance for this school has been good in Continuous Assessment Tests structured by subject teachers during teaching and learning process	56	3.00	5.00	3.9464	.72412
In the last five years the learners' academic performance for this school has been good in Summative assessments structured by subject teachers at the end of the term.	56	3.00	5.00	4.1071	.75507
In last five, numbers of unclassified learners decreased at your school	56	3.00	5.00	4.1786	.60624
Learners grades have increased in last five years at school compare to other years.	56	3.00	5.00	4.0714	.62834
Overall	56			3.9107	0.72412

The results in Table 5 showed that most of the respondents confirmed and strongly agreed that the following variables influence. These are, namely, learners' academic achievement: In the last five years, the learners' academic performance for this school has been good in comprehensive assessments structured by NESA at the end of the third term ($\mu=4.0179$ and $STD=0.61765$). In the last five years, In the last five years the learners' academic performance for this school has been good in summative assessments structured by subject teachers at the end of the term ($\mu=4.1071$ and $STD=0.75507$). In the last five years, the number of unclassified learners decreased at your school ($\mu=4.1786$ and $STD=0.60624$). Learners grades have increased in the last five years at school compared to other years ($\mu=4.0714$ and $STD=0.62834$).

The results also showed that for the remaining two variables, the respondents agreed: In the last five years, the learners' academic performance for this school has been good in national exams ($\mu = 3.9107$ and $STD = 0.74533$); in the last five years, the learners' academic performance for this school has been good in continuous assessment tests structured by subject teachers during the teaching and learning process ($\mu = 3.9464$ and $STD = 0.72412$).

Since the scale ranges from 1 to 5, the midpoint is 3. The mean (3.91) is slightly above the midpoint, suggesting a tendency towards agreement with the statement (potentially indicating a positive impact of learner-centered approaches). The standard deviation (0.74533) suggests a moderate level of variability in responses. Some students might strongly agree (higher score). While others might disagree or be neutral (lower score).

4.3 Regression Analysis

The data in Table 6 shows an R-square of 0.931, indicating that 93.1% of the variation in the dependent variable (learning outcomes) must be explained by the independent variable (active learning), while the remaining percentages can be clarified by other variables that are not examined in this model.

Table 6*Model Summary on Active Learning and Learning Out Comes*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.965 ^a	.931	.930	.10031	.931	729.931	1	54	.000

a. Predictors: (Constant), Active learning

b. Dependent variable: learning outcomes

The results from Table 7 show that active learning has a positive significant relationship ($F = 729.931$, p value 0.05) with learning outcomes in secondary schools at the advanced level in Rwanda. This indicated that H_0 is not accepted and the alternative one is accepted.

Table 7*ANOVA on Active Learning and Learning Outcomes*

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.345	1	7.345	729.931	.000 ^b
	Residual	.543	54	.010		
	Total	7.888	55			

a. Dependent Variable: Learning outcomes

b. Predictors: (Constant), Active learning

The results in Table 8 indicated that ($\beta=0.962$, when it is <0.05 and positive, confirms a relationship). Therefore, there is a positive relationship and a significant effect on learning outcomes in Rwandan secondary schools. This means that as the independent variable increases (active learning) by one unit, the dependent variable (learning outcomes) tends to increase by 0.962.

Table 8*Coefficient on Active Learning and Learning Outcomes*

Coefficients								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
		1	(Constant)	.118				
	Active learning	.962	.036	.965	27.017	.000	.890	1.033

a. Dependent Variable: Learning outcomes

The data in Table 9 indicated that 73.8% of change in dependent variable (learning outcomes) can be explained by independent variable (cooperative learning) while the remaining percentages can be clarified by other variables which are not examined in this model.

Table 9*Model Summary on Cooperative Learning and Learning Outcomes*

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.859 ^a	.738	.733	.19556	.738	152.263	1	54	.000

a. Predictors: (Constant), Cooperative learning

b. Dependent variable: learning outcomes



The results from Table 10 show that cooperative learning has a productively significant relationship ($F = 152.263$, p value 0.05) with learning outcomes in secondary schools at the advanced level in Rwanda. This indicated that H_0 is not accepted and the alternative one is accepted.

Table 10
ANOVA on Cooperative Learning and Learning Outcomes

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.823	1	5.823	152.263	.000 ^b
	Residual	2.065	54	.038		
	Total	7.888	55			

a. Dependent Variable: Factor4
b. Predictors: (Constant), Factor2

The results in Table 11 indicated that ($\beta=0.907$, when it is <0.05 and positive confirm a relationship). Therefore, there is positive relationship and significant effect on learning outcomes in Rwandan secondary schools at advanced level. This means that as the independent variable increases (cooperative learning) by one unit, the dependent variable (learning outcomes) tend to increase by 0.907.

Table 11
Coefficient on Cooperative Learning and Learning Outcomes

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.389	.297		1.311	.195	-.206	.985
	Factor2	.907	.073	.859	12.339	.000	.760	1.054

a. Dependent Variable: Learning outcomes

The data in Table 12 indicated that 49.2% of the change in the dependent variable (learning outcomes) must be explained by the independent variable (inductive teaching-learning), while the remaining percentages can be clarified by other variables that are not examined in this model.

Table 12
Model Summary on inductive teaching-learning and learning outcomes

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.701 ^a	.492	.482	.27254	.492	52.201	1	54	.000

a. Predictors: (Constant), Inductive teaching-learning
b. Dependent variable: Learning outcomes

The results from Table 13 show that inductive teaching-learning has a positive significance relationship ($F = 52.201$, p value 0.05) with learning outcomes in secondary schools at the advanced level in Rwanda. This indicated that H_0 is not accepted and the alternative one is accepted.

Table 13
ANOVA on inductive teaching-learning and learning outcomes

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.877	1	3.877	52.201	.000 ^b
	Residual	4.011	54	.074		
	Total	7.888	55			

a. Dependent Variable: Learning outcomes
b. Predictors: (Constant), Inductive teaching-learning

The results in Table 14 indicated that ($\beta=0.720$, when it is <0.05 and positive, confirms a relationship). Therefore, there is a positive relationship and a significant effect on learning outcomes in Rwandan secondary schools at the advanced level. This means that as the independent variable increases (inductive teaching-learning) by one unit, the dependent variable (learning outcomes) tends to increase by 0.720.

Table 14*Coefficient on Inductive Teaching-Learning and Learning Outcomes*

Coefficients ^a								
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		
	B	Std. Error	Beta			Lower Bound	Upper Bound	
(Constant)	1.155	.401		2.882	.006	.352	1.959	
Inductive teaching-learning	.720	.100	.701	7.225	.000	.520	.920	

Source: Research data

a. Dependent Variable: Learning outcomes

The results in Table 15 showed that there was a positive and significant relationship between factor 1 and factor 4 ($\beta = 0.777$, p value <0.05). This means that a unit of change in factor 1 increases factor 4 by 0.777 units while holding constant factors 2 and 3. In addition, there was a positive relationship between factor 2 and factor 4 ($\beta=0.208$, p value <0.05). This means that a unit of variation in factor 2 increases factor 4 by 0.208 units while extending constant factors 1 and 3. There was a negative and insignificant relationship between factor 3 and factor 4 ($\beta = 0.037$, $p = 0.05$). This implies that a unit of change in factor 3 decreases factor 4 by 0.037 units while holding factor 1 and factor 2. These results emanated from the following model:

$$Y = -0.115 + 0.037X_3 + 0.208X_2 + 0.777X_1$$

Where Y refers to changes in factor 4 as dependent variable (learning outcomes)

X1 refers to factor 1 (active learning)

X2 refers to factor 2 (cooperative learning)

X3 refers to factor 3 (inductive teaching-learning)

Table 15*Regression Coefficients On Learning Outcomes*

Coefficients ^a								
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		
	B	Std. Error	Beta			Lower Bound	Upper Bound	
Active learning	.777	.056	.780	13.783	.000	.664	.891	
Cooperative learning	.208	.063	.197	3.298	.002	.081	.335	
Inductive teaching-learning	.037	.048	.036	.765	.448	-.060	.133	

a. Dependent Variable: Learning outcomes

4.3 Findings from Interview

This section contains information from interviewees (head teachers and DOS's). The information given is related to the general objective of this study, that is to detect the effect of learner-centered approach on learning outcomes in secondary schools at advanced level in Rulindo district; Rwanda.

4.3.1 Effect of Active Learning on Learning Outcomes in Rulindo District Secondary Schools

Most interviewees when asked the question; the respondents said that the interests of active learning compared to traditional classroom activities are numerous: Active learning promotes student engagement and participation, making the learning process more interactive and dynamic; it encourages critical thinking, problem-solving skills, creativity, and collaboration among students; active learning activities allow students simply to put in practice, leading to better understanding and retention of information. Finally, it also enhances students' communication skills, as they are needed to discuss and present their ideas and findings.

The ideal balance between active learning exercises and more passive instruction in a secondary school classroom depends on the subject matter, the students' needs, and the learning objectives.

They said that “learning doesn't have to be all about sitting still and listening to a teacher talk. Active learning means getting students to actually do stuff, not just listen. This could involve students working together to solve a problem they might face in the real world, like how to build a strong bridge. Or, they might take turns explaining science ideas to each other. They even use historical documents to have a debate in class”.

4.3.2 Effect of Cooperative Learning on Learning Outcomes in Rulindo District Secondary Schools

Most of respondents confirmed that cooperative teaching-learning can indeed result in improved social and emotional growth in students, which can translate to better learning outcomes. When learners work in groups or pairs, they learn how to communicate, collaborate, and share responsibilities. This promotes teamwork, empathy, and active listening skills. It also helps students develop a sense of belonging, self-confidence, and adaptability, leading to a positive classroom environment and enhanced learning outcomes.

Most interviewers replied: “Learning with others can be way more powerful than going it alone! In cooperative learning, students work together in teams to reach a goal, like understanding a tough science concept. By explaining things to each other, everyone learns more and figure out where they might be stuck. They also get to practice teamwork skills like talking things out and working together to solve problems. Plus, discussing ideas with classmates gets their brains working overtime, helping them understand things better than just listening to a teacher lecture. This way of learning is a win-win for everyone!

4.3.3 Effect of Inductive Teaching-Learning on Learning Outcomes in Rulindo District Secondary Schools

Interviews of various schools administration confirmed that inductive teaching-learning differs from deductive teaching-learning in terms of the learning process and the order of instruction. Deductive teaching follows a top-down approach, where learners are first presented with general concepts, rules, or theories, and then apply them to specific examples. While, inductive teaching starts with specific examples or experiences that lead students to identify patterns, generalize concepts, and create theories. Both approaches have their merits so they can be used in combination to achieve optimal learning outcomes.

Most interviewers answered: “Inductive learning involves students discovering knowledge for themselves through exploration. Deductive learning, on the other hand, is about applying existing knowledge to solve problems. The best learning experience combine both approaches. By first exploring and making discoveries (inductive), students build a strong foundation. Then, applying those discoveries to solve problems (deductive) strengthens their learning and promotes critical thinking. This helps learners excel by encouraging both exploration and application of knowledge”.

V. CONCLUSIONS & RECOMMENDATIONS

5.1 Conclusions

Based on the findings, education can be successful when all the partners work together to satisfy learners' academic achievement. This means that the government, non-governmental organizations, local communities, and parents have to work together to create a conducive environment that could make students feel motivated. After examining the effect of active learning on learning outcomes in secondary schools, it can be concluded that active learning positively impacts student learning outcomes. Students who engage in active learning methods, such as discussions, hands-on activities, and group work, tend to have high levels of understanding, retention, and critical thinking skills. This suggests that incorporating active learning strategies into secondary school classrooms can enhance the overall learning experience and improve academic achievement.

The examination of the effect of cooperative learning on learning outcomes in secondary schools reveals that cooperative learning has a positive impact on student achievement. When students work collaboratively in groups towards common goals, it fosters active participation, interaction, and cognitive engagement, leading to improved learning outcomes. Cooperative learning enhances communication skills, promotes peer support, facilitates knowledge sharing, and encourages critical thinking. Therefore,

incorporating cooperative learning strategies in secondary schools is an effective approach to enhancing learning outcomes.

The examination of the effect of inductive teaching and learning on learning outcomes in secondary schools indicates that it is a beneficial approach for enhancing student learning outcomes. Inductive teaching-learning methods involve presenting specific examples and allowing students to derive general principles or concepts from those examples. This approach promotes active student engagement, critical thinking, problem-solving skills, and deep understanding. By encouraging students to actively analyze information and draw conclusions, inductive teaching-learning methods enhance knowledge retention and long-term understanding. Consequently, incorporating inductive teaching-learning strategies in secondary schools can significantly improve learning outcomes.

5.2 Recommendations

Based on the results of this research, researchers have come up with some recommendations for education partners, such as the government, stakeholders, parents, and school leaders. For making a learner-centered approach very successful, here are some recommendations.

The government of Rwanda must promote and support the implementation of a learner-centered approach in secondary schools by providing the necessary resources, training, and guidance to educators. It must also collaborate with international organizations and experts to exchange best practices and experiences in learner-centered education.

According to stakeholders, they advocate for the adoption and implementation of learner-centered approaches in secondary schools through active participation in policy discussions and decision-making processes. They must support initiatives that provide training and professional development opportunities for teachers to enhance their understanding and skills in learner-centered pedagogy.

Based on school leaders, they must provide leadership and guidance to facilitate the adoption and implementation of learner-centered practices in secondary schools. They must allocate resources, both financial and human, to support teacher training, curriculum development, and the creation of learner-centered classrooms.

According to parents, they must encourage open relationships with teachers and school administrators to stay informed about learner-centered practices and their child's progress in such an environment. They must participate in parent-teacher associations and other school-level initiatives to participate in the implementation and improvement of learner-centered approaches.

REFERENCES

- Ahn, H. J. (2010). The effects of cooperative learning on Student motivation in a science classroom. *Journal of Educational Research, 103*(3), 227-240.
- Ainsworth, S., Prain, V., & Tytler, R. (2018). *Learning science in a changing world: New directions for classroom teaching*. London: Routledge.
- Akyol, Z. (2019). The impact of learner centered teaching on student engagement and learning outcomes. *International Journal of Instruction, 12*(20), 121-128.
- Al-Obaidi, A., & Nordin, N. B. C. (2016). The Effectiveness of a Student- Centered Approach in Teaching Mathematics. *Journal of Education and Practice, 7*(2), 196-202.
- Al-Zu'be, A. F. M. (2013). The Difference between the Learner-Centered Approach and the Teacher-Centered Approach in Teaching English as a Foreign Language. *Educational Research International, 2*, 24-31.
- AUC. (2018). *Continental Education Strategy for Africa (CESA 16-25): The Education We Want for All*. African Union Commission. <https://ecosoc.aun.int/sites/default/files/2021-09/continental-strategy-education-africa-english.pdf>.
- Barkley, E. F., Cross, K. P., & Major, C. H. (2014). *Collaborative learning techniques: A handbook for college faculty*. New Jersey: John Wiley & Sons.
- Beatty, I. D., & Lienhardt, J. (2019). Active learning in medical education: A review of the literature. *Journal of Medical Education, 100*(11), 1602-1610.
- Bryman, A. (2016). Integrating quantitative and qualitative research: How is it done? *Qualitative Research, 16* (5), 603-618.

- Creswell, J. W. (2014). *Research design. Qualitative, quantitative and mixed methods approaches* (4th ed.). New York: Sage Publications.
- Deslaurien, L., McCarty, K., Miller, K., Griffiths, P., Sylvan, C., & Stecyk, G. (2019). Measuring the impact of active learning on student engagement and outcomes: A meta-analysis. *Journal of Educational Psychology, 111*(9), 981-1016.
- Deslauriers, A., Schelfle, D., & McCabe, C. (2019). Science classrooms that promote active learning: An update on the evidence. *Science Education, 103* (3), 855-883.
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences, 111*(23), 8410-8415.
- Gillies, R. M. (2007). Cooperative learning: Reviewing the effectiveness and critical issues. *International Journal of Educational Research, 46* (1), 70-114.
- Gupta, A., & Bhagat, S. K. (2020). The impact of collaborative learning strategies on student achievement in higher education: A meta-analysis. *International Journal of Educational Development, 76*, 102156.
- Johnson, D. W., Johnson, R. T., & Smith, K. A. (2014). Cooperative learning: Improving university instruction by basing practice on validated theory. *Journal on Excellence in College Teaching, 25*(3&4), 85-118.
- Kamanzi, J.P., & Nsengiyumva, J.B. (2018). Effect of cooperative learning on social studies achievement of secondary school students in Rwanda. *Journal of Education and Practice, 9*(18), 101-107.
- Kuhn, D. (2020). *Student learning in Science: Context and consequences*. London: Routledge.
- Lang, J. C. (2016). Can flipped classrooms improve student learning? A systematic review of educational research (2000-2005). *Educational Research Review, 17*, 27-38.
- Markovits, H., & Lindell, E. (2018). *Reasoning and Decision Making in Medicine*. New York, NY: Springer Science+ Business Media.
- Ministry of Education, Rwanda. (2021). Education Sector Strategic Plan (ESSP) 2018/19 to 2023/24. Retrieved June 17, 2023 from <https://www.globalpartnership.org/content-sector-strategic-plan-2018-2024-rwanda>.
- Mushimiyimana, E. (2019). Effectiveness of inductive teaching strategies on students' learning outcomes in a science class in Rwanda. *Journal of Education and Practice, 10*(20), 179-189.
- Neuman, W. L. (2014). *Social research methods: Qualitative and quantitative approaches* (7th Ed.). Boston, MA: Pearson.
- Ntukamazina, D., Rugira, J., & Rutayunga, J. B. (2016). The effectiveness of inductive teaching method in improving the academic performance of secondary school students. *International Journal of Education and Research, 4*(6), 113-122.
- Ntuyabaliwe, F., & Rutarohereza, M. (2018). Active Learning and Student Performance in Senior Three Mathematics in Kigali, Rwanda. *Rwanda Journal Series A: Humanities and Social Sciences, 2*(1), 99-114.
- OECD. (2020). *Education at a Glance 2020: OECD Indicators*. Paris: OECD Publishing. <https://doi.org/10.1787/69096873-en>.
- Ozguner, O. F. (2019). A Review of Recent Research on inductive Reasoning. *SAGE Open, 9*(3), 1-10.
- Parmelee, D. X., & Michaelsen, L.K. (2020). *Active Learning in Higher Education: A Review of the Research on Student Engagement, Learning Outcome, and Development of 21st Century Skills*. Sterling, VA: Stylus Publishing, LLC.
- Sauviy, J. -J. (2019). *Constructivism in Teacher Education: Moving from Theory to Practice*. Dordrecht, Netherlands: Springer.
- Slavin, R. E. (2018). Cooperative learning and the achievement gap. *Phi Delta Kappa, 99*(7), 82-86.
- UNESCO. (2017). *Moving Towards learner-centered education in sub-Saharan Africa*. United Nations Educational Scientific and Cultural Organization. Retrieved June 1, 2023 from <https://unesdoc.unesco.org/ark:/48223/pdf0000254478>.
- UNESCO. (2018). *Education 2030: Incheon Declaration and Framework for Action for Sustainable Development*. United Nations Educational Scientific and Cultural Organization. https://www.uis.unesco.org/sites/default/files/2030-incheon-framework-for-action-implementation-of-sdg4-2016-en_2.pdf.



- World Bank. (2020). *World Development Report 2020: Trading for a more Inclusive World*. The World Bank. Retrieved June 2, 2023 from <https://www.worldbank.org/>.
- World Bank. (2021). *World Bank Development Report (2021): Mind, Society, and Behavior*. Washington DC: World Bank
- Yamane, T. (1973). *Statistics: An Introductory Analysis* (3rd ed.). New York, NY: Harper and Row.
- Yildirim, S., & Karakaya, F., (2021). Learner-centered education in the 21st century: A literature review. *Journal of Educational Technology & Development Exchange (JETDE)*, 147-157.