

## **The Impact of Teaching Strategies on the Understanding of Economic Concepts by Students in General Secondary Schools in Bangui (Car)**

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### **Abstract**

The Central African Republic is one of the Central African countries in which students' level of understanding of economics remains relatively low. This research aims to assess the impact of learner-centered teaching strategies on students' understanding of economic concepts. To achieve this objective, an experimental study was conducted among three hundred and eighty-four (384) learners attending the second "B" class. Propensity score double difference analysis was used to estimate the impact of these teaching strategies. The results show that the average score of learners who were taught with these strategies was higher than that of learners who were not taught with these strategies (10.81 versus 5.86). The difference of 4.95 points is significant at the 10% threshold. These results confirm that the development of learner-centered teaching strategies in a teaching program leads to better results.

**Keywords:** teaching strategies; economics; didactic transposition; didactic contract; learner "representations"

### **Introduction**

The study of learning disabilities is complex and difficult. For years, researchers have been interested in understanding these difficulties and cognitive behaviors (ODD 4 Data Report 2018, UNESCO). The most recent studies on the quality of education have identified the development of cognitive skills as an important dimension [Hanushek, 2013]. These learning goals can only be achieved through pedagogical and didactic approaches that engage learners in authentic intellectual activity. Learner-centered and teacher-centered approaches have always coexisted and competed with each other in education [Chall, 2000; Ravitch, 2000]. Several previous research syntheses on the theme of effective teaching have shown the superiority of teacher-centered teaching strategies [Bissonnette and al, 2005].

Despite these results, several researchers note that current pedagogical discourse seems to value learner-centered teaching strategies [Chall, 2000 and Ravitch, 2000].

In the field of economics, the learner-centered teaching strategy was introduced in the early 20th century through case studies. This strategy aims to generate learning at the level of attitudes, thinking reflexes, personal qualities, judgment, the processes that lead to problem solving, decision making and reflection on experience [Bédard and al, 2005; Christensen, 1991a]. However, several decades after the emergence of the learner-centered teaching strategy in the teaching/learning process in secondary school, there is a desire to promote learner activity, document work, and inquire into practice. These developments raise questions about the effectiveness of teaching strategies.

In the Central African Republic, although the teacher-centered teaching strategy has been the only one used in economics education for the past 30 years, we can hypothesize that it has been adapted to Central Africans' representations of the teaching and learning of economics.

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However, success rates on the economics test during two rounds of the baccalaureate over the last five (5) years are below 15%. This low rate is due to several reasons, including the lack of solid training in economics for learners who reach the final B level. This issue is of extreme importance and is due to the lack of understanding and mastery of fundamental economic concepts taught in the first and second years of high school [Neheme, 2009]. As a result, learners have an unscientific attitude toward economic phenomena when they express themselves in class and in their written work.

With four to six hours of economics study per week, at the end of three years (from 10<sup>th</sup> grade to 12<sup>th</sup> grade) of learning about economics, or approximately 570 hours, the level attained is a beginner's level. It therefore seems somewhat difficult to argue that the teacher-centered teaching strategy applied in the teaching of economics in the Central African Republic is effective in helping learners to understand economic concepts. Moreover, economics is a social science in which several paradigms cohabit sustainably, and it is not easy to distinguish them. Hence, the rigid presentation of these paradigms can constitute obstacles to learning.

This set of concerns contributes to the construction of the problem of this work, which can be summarized in the following main question: what is the impact of learner-centered teaching strategies on the understanding of economic concepts? This main question can be broken down into two subsidiary questions: what are the difficulties inherent in the implementation of these teaching strategies by teachers? Do these teaching strategies, when properly carried out by teachers; generate interest and the best opportunities for learners to learn about economics?

To examine this issue, the following general hypothesis was formulated: teaching strategies (pragmatic, problematizing and critical questioning strategies) that are learner-centered are likely to improve learners' understanding of economic concepts. In this regard, Weimer (2013) attests that learner-centered teaching strategies tend to improve learners' satisfaction with the learning experience and deepen their understanding of how knowledge can be valued in their own lives.

From this general hypothesis, two secondary hypothesis arises: the organization of seminars/workshops for teachers would inevitably enhance their skills in implementing these teaching strategies. To this end, Johnstone and Chapman (2009) argue that the lack of workshops/training has a seriously detrimental impact on teachers' professional qualifications. The implementation of these teaching strategies by teachers motivates learners to actively participate in economics courses. Research by Viau and al. (2004) suggests a link between teaching strategies that intellectually stimulate learners and motivation them to learn.

The overall objective of this study is to assess the impact of learner-centered teaching strategies on learners' understanding of economic concepts. The specific objectives are to shed light on teachers' difficulties in implementing learner-centered teaching strategies and to observe the impact of these teaching strategies on students' learning in the classroom.

Double-difference propensity score analysis was used to estimate the impact of these teaching strategies. The three techniques of observation, questionnaire and interview were used to collect data. This article is structured around the introduction, the conceptual field and review of the literature, the methodology and the results.

## 1. Conceptual field

The definitions of a number of concepts are highly variable, which reflects a real problem. It is also a question of identifying how they are discussed in the literature and/or specialized publications.

- *Learner-centered teaching strategies*: These correspond to new, modern, open and progressive pedagogies [Chall, 2000]. In these strategies, learners' needs are the primary consideration in course design. These strategies also refer to practice that requires learners to take significant responsibility for conducting investigations, applying knowledge, and defining what they have learned. Learner-centered teaching strategies are sometimes associated with "non-directive instruction", which reduces the time spent in class and increases the time spent in the classroom on analysis, evaluation, problem solving and information processing activities [Keachie, 1954; 1951, Albrecht & Gross, 1948]. Thus, in this article, learner-centered teaching strategies refer to the combination of pragmatic, problem-oriented and critical strategies to achieve the instructional goal.

- *Economics*: Economics is a discipline of the humanities and social sciences that scientifically studies the functioning of the economy, i.e., the description and analysis of the production, exchange and consumption of goods and services. Thus, according to Lionel Robbins' canonical conception ("it is science that studies the allocation of rare goods for

alternative purposes"), scarcity is a distinctive criterion. The term "economics" in this article refers to the economic sciences.

- *Learners' conceptions/representations*: In 1990, Giordan suggested replacing the term "representation" with "conception" to avoid the confusion inherent in the use of the same concept by two different fields of knowledge (here, didactics and social psychology). This concept is mainly used by second-generation didacticians, who suggest that the conceptions that learners develop about the world and/or natural and/or social phenomena are based on opinion, or what Bachelard calls common sense. These conceptions inevitably come into conflict with the scientific knowledge that the school must make learners acquire; hence the interest shown by the didactics of the disciplines in the problem of learners' initial conceptions.

- *The didactic transposition*: Teaching is the result of a didactic treatment that obeys precise requirements: a separation is made between scholarly knowledge (as it emanates from research) and taught knowledge (that which the observer encounters in classroom practices). According to Chevallard (1995), didactic transposition is the process by which the passage from knowing to knowing learned by learners takes place. Reuter and al. (2011) distinguish between an external didactic transposition, which is putting into text, and an internal didactic transposition, which is the elaboration of the lesson delivery.

- *The didactic contract*: The term "didactic contract" has its origin in the study of selective chess in mathematics [Brousseau, 1988]. This expression is explained first by the contract between the teacher and the learner and then by the didactic time.

Chevallard (1985) spoke of the "didactic contract" as a framework in which all teaching acts take place. It is a contract insofar as the teacher and the learner expect a certain type of behavior from each other. Thus, the teacher is expected to perform his or her tasks in an effective way in terms of the teaching method (or strategy) and the evaluation of his or her learners. Learners are expected to perform the tasks set by the teacher and to take an interest in the subject matter being taught. It is this conception of the didactic contract that is retained in this work.

## 2. Literature review

Criticisms persist about the effectiveness of pedagogical and didactic approaches. The critical review of the literature that is proposed here is based on a few works related to this study.

From a theoretical point of view, Wyk (2010) indicates that the teacher must create a teaching-learning situation in which learners can master critical and developmental outcomes, high levels of knowledge, skills and positive attitudes in the field. Learners must be able to identify problems and find solutions to those problems. Teachers are thus enabled to initiate in such a way that knowledge, skills and positive attitudes can be optimized among learners in their economic environment. Learners are expected to learn in small groups, talk, question, learn and respond during sessions. A teacher facilitates the learning process for each group, and learning is learner-centered, problem-based and self-directed. The role of the teacher is that of a facilitator.

Hervani and Helms (2004) argue that higher levels of understanding require involvement in the application and use of concepts. This process seems to help, especially when learners are learning to solve problems. It is also necessary for learners to take advantage of real-life examples and develop a greater understanding of the relevance of the concepts they are learning. Current economic events are presented in the classroom to help fill in the gaps created by learners' lack of real-life experience, further enhancing their motivation to learn. It is important for teachers to actively involve learners in the lesson as this has the potential to reduce the gap between theory and practice.

In another argument for the use of learner-engaging or learner-centered strategies in the economics classroom, Joshi and Marri (2006) argue that constructivism is the preferred solution for pedagogy in progressive economics and social sciences in high school classrooms. This is because economic concepts such as scarcity, markets and reserves, and banks are better understood in action through experience, and students are more engaged by such methods.

Hirsch (2003) notes that since economics are often taught as a dry, analytical subject, it is difficult for learners to become familiar with it in everyday life. This author adds that teaching economics to secondary school learners requires that the subject be made real, which should not be difficult because learners' daily lives consist largely of economics.

They constantly make economic choices when purchasing goods and services, and they operate the equivalent of small businesses in activities such as fundraising. Teaching economics using traditional teacher-centered methods does not help learners understand economic concepts because they remain passive recipients of knowledge. Learners find it difficult to understand and make sense of the concepts they are taught because they cannot relate them to the outside economic world. The content knowledge of teachers must be complemented by their didactic knowledge for effective teaching.

Therefore, the teacher must continually research teaching methods that can have an impact on learners. Parkinson and Sorgman (2005) explain that although teachers may gain knowledge of economics after an economics education, their education does not give them the opportunity to teach economic concepts to their learners, which can make learners feel negatively toward economics.

Cendana and al. (2018) conducted an empirical study in the Philippines on the impact of the application of learner-centered learning on cognition and social learning. The main objective of this study was to explore the impact of technology-enhanced learning on learners' cognitive thinking in terms of their ability to understand computer-assisted instructions, adopt new knowledge, and apply mental activities and skills to perform reasoning and grasp what is being taught using learner-centered learning software. The study also aimed to determine the impact of technology-based learning on social learning in terms of the learner's ability to learn and perform activities with peers or in group work. Experimental research was applied, and a pretest questionnaire was used to collect data from 300 higher education learners in two (2) private universities in the Philippines.

The author used unidirectional ANOVA and regression analysis in his work. The study found that at the lower 95% confidence level, the frequency of learner use, the time spent performing activities and learners' level of comprehension differed significantly from their cognition, where  $p = 0.000 < 0.05$ . The t-test showed that learners' engagement in peer and group activities differed significantly, with  $p$  values  $< 0.05$  and variance = 0.20 in relation to their social learning. Thus, the integration of learner-centered learning software can positively support active learning, increase cognitive thinking, and stimulate enthusiasm and social learning. Learners' interactivity with computer-assisted technology can therefore lead to a productive learning process.

Louyindoula (2016) conducted his PhD dissertation, with the title "Impact of experimental activities on the understanding of electromagnetism phenomena", in general education schools with students of the 1st C and D class in Brazzaville. The aim was to determine the impact of experimental activities on learners' understanding of the physical phenomena studied. To evaluate the impact of this pedagogical practice, the author used the comparative method of average scores. The results showed that the contributions to the understanding of the theoretical courses were lower than those of the experimental courses, which were teachings centered on the learners' activities. These indices of progress varied between 2.05 and 7.69 for the LUMUMBA high school, 2.02 and 6.59 for the CHAMINADE high school, and 0.43 and 7.07 for the JAVOUHEY high school. The author concluded that the experimental activities elaborated in teaching had a positive impact on learners' understanding of the phenomenon of electromagnetism.

Another study was conducted in Tanzania by Mtitu (2014) on "learner-centered teaching in Tanzania based on the perceptions and experiences of secondary school geography teachers". The concern of the research was to evaluate the implementation of the learner-centered approach as advocated by the educational policy and mandatory curriculum documents in Tanzania. The study used an interpretive and constructivist qualitative case study approach involving nine purposefully selected case studies from three research sites. Data were collected through semi structured interviews, classroom observations and detailed reviews of teachers' own teaching portfolios. The findings identified aspects that influence teachers' practices of learner-centered teaching, including a constructivist view of knowledge construction. The shift from a teacher-centered to a learner-centered pedagogical approach is one of the aspects involved in addressing quality issues in the delivery of secondary education in Tanzania.

Ganyaupfu (2013) conducted a study in South Africa on the theme of "teaching methods and academic performance of students". The objective of this study was to examine the differential effectiveness of teaching methods on students' academic performance. A sample of 109 undergraduate students from the Department of Economics and Business Studies was used for the study. Using a course on differential statistics for students, the results of the assessment tests were taken from the internal classroom test prepared by the professor.

The differential effectiveness of the three teaching methods on students' academic performance was analyzed using the univariate ANOVA technique based on a linear model, the F-statistic (2, 106) ( $= 10.125$ ;  $p < 0.05$ ) and Tukey's HSD. Posthoc results indicated significant differences in the effectiveness of the three teaching methods. The mean scores showed that the interactive teacher-student method was the most effective method in teaching, followed by the learner-centered method; the teacher-centered approach was the least effective teaching method. The author concluded that students more effectively gain a better understanding of key concepts when they are engaged in problem solving during classroom activities.

From the literature reviewed above, it appears that the impact of learner-centered teaching strategies on students' understanding of key concepts is not unanimously agreed upon. Some see these strategies as an effective approach to students' understanding of key concepts. Indeed, a learner-centered approach is based on (socio-) constructivist theory. Others, however, believe that teacher-centered teaching strategies are the most effective. These authors rely on classical theories to justify their position. Several studies have been conducted from an empirical perspective with different results. This difference stems, among other things, from the methodologies used. Some authors have used the unidirectional ANOVA technique and regression analysis, whereas others have used the comparative test score method. Relying solely on the strong assumption of the randomized social experiment (RSE) that the two groups are sufficiently comparable to allow measurement of the net effects of teaching practices could bias the effects. An effect of practice could be detected where there is none, or, conversely, an actual effect could be diminished. For example, the individual characteristics of learners from the two groups may not be comparable, resulting in a lack of comparability and selection bias.

This work distinguished from the others by the use of the technique of "matching" combined with the double difference that, to our knowledge, has not previously been taken into account. It is, however, more in the spirit of complementarity than opposition that this method is used in this work. "Matching" makes it possible to control the selection bias on observable factors, while the double differences make it possible to control this bias on unobservable factors when the influence of unobservable characteristics on the variable of interest is considered to be constant over time. Thus, the combined use of these two methods allows a better correction of selection bias, and the resulting estimate of the impact of these teaching strategies on students' understanding of economic concepts will be a more reliable measure of causality.

### 3. Methodology

To evaluate the impact of these teaching strategies on learners' learning outcomes, the method of combining "matching" with double difference analysis (Heckman and al., 1998) was used. The idea is to apply the propensity score method to reinforce the comparability of samples of learners who have been taught with these strategies and those who have not before applying the double difference. There are two observation periods: before and after the application of these strategies.

In the period before, the propensity score technique is applied to match the sample of learners who have been taught with these strategies with the sample of learners who have not been taught with these strategies and who have a similar propensity score. Next, the double difference method is applied by calculating the difference in the average pretest and posttest scores between the sample of learners taught with these strategies and the sample of learners matched to them. The interest of this evaluation method lies in managing the sources of selection bias that can arise when randomly allocating the sample to the two groups: learners who have been taught with these strategies, called the treatment group, and learners who have not, called the control group.

To this end, a survey was conducted during the first quarter of the 2018-2019 school year. The target population of this study was thirty-five (35) economics teachers working in general secondary schools and two thousand seven hundred and sixty (2760) learners attending the second class of the economic and social stream in Bangui in the two sectors, namely, public and private. Our research sample consisted of 11 economics teachers and 384 learners aged 14 to 24 years old, 58% of whom were boys and 42% girls. To select the individuals, we used simple

random sampling for the teachers and probability sampling, including multistage sampling and guided by certain constraints (reasoned sampling: high schools, grades, classes, learners), for the learners.

Following this survey, two courses were conducted in these two groups.

For the treatment group, before the start of the research, a previously trained teacher explained to the learners the new teaching strategy that would be followed in the next teaching hours. The learners enthusiastically accepted the research, and the procedure began. First, a pretest was performed using a questionnaire examining learners' knowledge of the concepts of economic needs, economic goods and scarcity. The pretest aimed to understand the learners' level of knowledge on the subject and compare it with the final results. The teacher then conducted the course by applying learner-centered teaching strategies. An identical posttest was administered at the end. For the control group, the course proceeded as usual. The same test was performed at the beginning and end of the course using the same questionnaire.

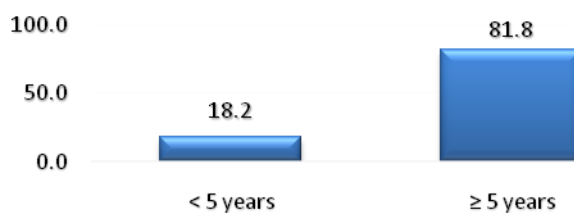
The field survey technique allowed for questionnaires, observations and interviews to be used to collect data from the subjects (teachers and learners) of our study and to quantify them. Data processing and analysis were performed by SPSS and STATA. The t-test made it possible to determine whether the difference in learning outcomes between the two groups was significant at the 5% threshold.

#### 4. Results

As previously mentioned, the interview, questionnaire and observation survey were used in this work to obtain a certain amount of data. After presenting the results, we will compare them with our theoretical elements.

##### 4.1 Descriptive Analysis of Teacher Interviews

**Figure 1: Distribution of teacher responses by professional experience**



Source: LARES (2019), based on the survey conducted in Bangui.

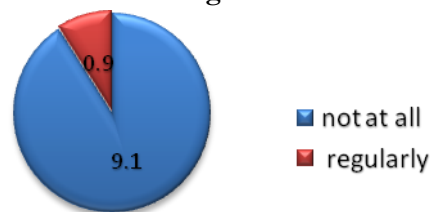
According to the figure above, 82% of the economics teachers surveyed had more than 5 years of experience in teaching economics, and 18% had less than 5 years.

**Figure 1: Distribution of teacher responses by initial professional training**



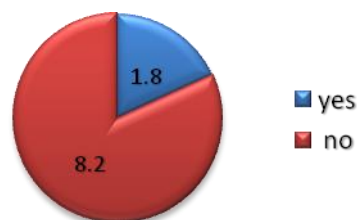
Source: LARES (2019), based on the survey conducted in Bangui.

Analysis of the figure above indicates that 100% of the economics teachers interviewed had undergone initial professional training for two (2) years at the Higher Normal School of Bangui.

**Figure 1: Distribution of teacher responses by in-service training**

Source: LARES (2019), based on the survey conducted in Bangui.

The figure above shows that 91% of the economics teachers surveyed responded that they had not participated in seminars or workshops on the didactics of economics. These seminars and workshops constitute in-service training for teachers.

**Figure 4: Distribution of teacher responses by learning to the development of learner-centered teaching strategies**

Source: LARES (2019), based on the survey conducted in Bangui.

The figure above shows that 82% of the economics teachers surveyed responded that they did not learn to develop learner-centered teaching strategies during their training. As a reason, they stated that these strategies were not taught. In contrast, 18% of the teachers responded that they had learned to develop these strategies.

**Figure 5: Distribution of teacher responses by choice of teaching strategy**

Source: LARES (2019), based on the survey conducted in Bangui.

The figure above shows that 82% of the teachers of economics had chosen the teacher-centered strategy to teach the concepts of economic needs, economic goods and scarcity. On the other hand, 18% chose the learner-centered strategy to teach these concepts.

### Descriptive analysis of direct observation of learners in the classroom

The results are presented here in general terms for both the control and treatment groups.

Control group results: This session lasted two hours. Observations of learners' attention in the classroom in which the course took place suggest that learners were less attentive at one point, some did not follow the teacher, and the room was less pleasant. The learners were less talkative. In terms of learner participation, the observation showed that learners were less involved in the course, although some learners were able to respond to the teacher's questions. Interactions between the learners and the teaching and the learners and their peers were weak. In this regard, the only overall mark that could be given to these groups in relation to the observations made and in accordance with the observation grid is 12/20.

Results of the treatment groups: Learners were observed for two hours (2 h) in a session in which learner-centered teaching strategies were applied, focusing on the concepts of economic needs, economic goods and scarcity. The observations provided information on the climate in which teaching/learning took place. The learners were enthusiastic and caring, and the climate was pleasant. In terms of learner participation, the learners were highly motivated when the teacher told them to form small groups of three (3) learners to work on analyzing documents (images and text).

The learners actively participated in the course and showed enthusiasm in performing the tasks requested by the teacher, both in the discussion among themselves (learners and learners) and between learners and teachers. Furthermore, they wanted to open another debate on a subject that was not part of the day's lesson. This allows us to say that the assessment was very good. Throughout the course, the learners jostled each other either, asking questions or answering the teacher's questions. The overall mark assigned to this group was 17/20 for their attitude during this session in which learner-centered teaching strategies were applied.

#### 4.2 Descriptive Analysis of the Learner Questionnaire

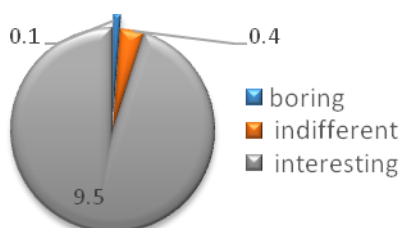
**Table n°1:** Characteristics of Sampled Learners

Learner Characteristics N(%)		Total (N=384)	Control Group (N=169)	Treatment Group (N=215)
Sex	male	224 (58.3)	101 (59.8)	123 (57.2)
	female	160 (41.7)	68 (40.2)	92 (42.8)
Age	14-17	142 (36.9)	44 (26.1)	98 (45.6)
	18-21	227 (59.2)	118 (69.8)	109 (50.7)
	22-24	15 (3.9)	7 (4.1)	8 (3.7)
Repeating	no	326 (84.9)	132 (78.1)	194 (90.2)
	yes	58 (15.1)	37 (21.9)	21 (9.8)
Language	Sango	325 (86)	150 (90.4)	175 (82.6)
	French	50 (13.2)	15 (9)	35 (16.5)
	others	3 (0.8)	1 (0.6)	2 (0.9)
Repeater	no	33 (8.6)	152 (90.5)	196 (92.0)
	yes	348 (91.4)	16 (9.5)	17 (8.0)
Father's profession	farmer	30 (7.8)	12 (40)	18 (8.4)
	craftsman	53 (13.8)	26 (49.1)	27 (12.6)
	employee	99 (25.8)	44 (44.4)	35 (25.6)
	worker	50 (13)	20 (40)	30 (14)
	executive	36 (9.4)	17 (47.2)	19 (8.8)
	intermediary profession	80 (20.8)	35 (43.8)	45 (20.9)
Test mean (standard deviation)	pretest	5.62 (2.94)	5.98 (2.94)	5.33 (2.92)
	posttest	9.18 (4.51)	6.29 (2.86)	11.44 (4.27)

**Source:** LARES (2019), based on the survey conducted in Bangui.

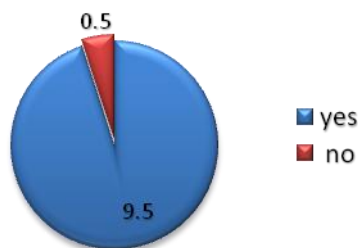
A total of 215 learners were taught with these strategies, and 169 were not. Their average pretest scores were 5.33 and 5.98, respectively. The dispersion of the distribution of scores relative to the mean in the two groups was 2.92 and 2.94, respectively. For the posttest, the treatment group had a mean score of 11.44, and the control group had a mean score of 6.29. The dispersion of the distribution of scores relative to the mean in the two groups was 4.27 and 2.86, respectively.



**Figure 6: Distribution of learner responses by course motivation**

Source: LARES (2019), based on the survey conducted in Bangui.

The figure above shows that 95% of learners responded that the course in which learner-centered teaching strategies were applied was interesting. They cited these applied strategies as the reason for their active participation in the class. On the other hand, 1% of learners found it boring, and 4% were indifferent.

**Figure 7: Distribution of learner responses by earned benefits**

Source: LARES (2019), based on the survey conducted in Bangui.

Figure 7 above indicates that 95% of learners responded that they gained benefits from everything they learned. On the other hand, 5% of learners responded that they did not gain any benefits. The benefits acquired by learners included understanding, knowledge, discovery, and collaboration.

#### 4.2 Analysis of Teacher Interview Results

The decomposition of these results revolves around two (02) points: the source of teachers' skills and the strategy chosen in teaching the concepts of economic needs, economic goods and scarcity.

The sources of the skills of economics teachers

Analysis of the sources of the skills of the teachers interviewed requires an examination of their professional characteristics. These include professional experience and initial and continuing education.

The teachers had all undergone initial training and had more than five (5) years of professional experience in teaching economics. Mauritius (2006) states that "adaptation to an environment would generate knowledge or know-how that is more available during the action". This suggests that the professional characteristics of our audience could contribute to the development of a teaching strategy adapted to the content and objectives of economics courses at the secondary level.

These findings differ from those of Johnstone and Chapman (2009) and Neheme (2009) in Lesotho and Lebanon, respectively, who found that no importance was given to the initial training of secondary school economics teachers. However, an essential point is missed if one does not conceive of their skills as components of the process of professionalization of the teaching profession. The implementation of an effective teaching strategy can only be successful with a truly professional and experienced teacher. It is important to define minimum or optimal competencies for teaching. To meet this requirement, teachers' knowledge of the didactics of economic sciences is of great interest in their professionalization.



Learners were randomly assigned to two groups. Randomization was intended to produce, in principle, two groups that were comparable in terms of both individual characteristics and initial test scores. However, despite randomization, learners in the two groups did not have similar initial characteristics. Preliminary analyses, i.e., tests comparing means, showed that the two groups showed significant differences both for the pretest [ $\Pr(|T| > |t|) = 0.0318$ ] and in terms of individual characteristics. These differences could mask the protective effect of these strategies. Hence, it was necessary to apply matching combined with the double difference to reinforce the comparability between the two groups prior to the implementation of these strategies.

By applying the kernel in STATA, we obtained the following results.

**Table n°4:** t-test at period = 0:

<i>Weighted Variable(s)</i>	<i>Mean Control</i>	<i>Mean Treated</i>	<i>Diff.</i>	<i> t </i>	<i>Pr ( T  &gt;  t )</i>
<i>Pretest</i>	5.559	5.032	0.527	1.48	0.1397
<i>Father's profession</i>	4.237	4.302	0.065	0.29	0.7755
<i>Age</i>	17.753	17.633	0.120	0.58	0.5592
<i>Sex</i>	0.479	0.518	0.039	0.62	0.5337
<i>Repeating</i>	0.050	0.058	0.008	0.28	0.7778
<i>Language</i>	0.209	0.194	0.015	0.29	0.7712
<i>Repeater</i>	0.112	0.094	0.019	0.49	0.6233

Source: LARES (2019), based on the survey conducted in Bangui.

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$

The results in this table show that there are no significant differences between the two groups in either the pretest [ $t = 1.48$ ;  $P = 0.1397 > 0.1$ ] or the characteristics of the learners in the two groups. The null hypothesis ( $H_0$ ) is confirmed. The two groups are identical and therefore comparable.

**Table n°5:** t-test at period = 1:

<i>Weighted Variable(s)</i>	<i>Mean Control</i>	<i>Mean Treated</i>	<i>Diff.</i>	<i> t </i>	<i>Pr ( T  &gt;  t )</i>
<i>Posttest</i>	5.864	10.817	4.952	10.95	0.0000***
<i>Father's profession</i>	4.237	4.302	0.065	0.29	0.7755
<i>Age</i>	17.753	17.633	0.120	0.58	0.5592
<i>Sex</i>	0.479	0.518	0.039	0.62	0.5337
<i>Repeating</i>	0.050	0.058	0.008	0.28	0.7778
<i>Language</i>	0.209	0.194	0.015	0.29	0.7712
<i>Repeater</i>	0.112	0.094	0.019	0.49	0.6233

Source: LARES (2019), based on the survey conducted in Bangui.

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$

When adding the same individual characteristics of learners in the comparison of average scores after the application of these strategies in teaching (posttest), it is noted that  $t = 10.95$ ;  $P = 0.0000 < 0.01$  (Table 3). The null hypothesis ( $H_0$ ) is rejected. There is a significant difference at the 10% threshold of 4.95 points between the average scores of the two groups: the average of learners who have been taught with these strategies is higher (10.81 vs. 5.86) than that of learners who have not. Learner-centered teaching strategies are effective in improving students' learning outcomes.

## 4.6 Discussion

An effective teaching strategy is a way for teachers to help learners acquire knowledge and develop their intellectual abilities, skills, habits, attitudes, feelings and emotions.

In this experimental study, learner-centered teaching strategies promoted active learning; involved collaboration among learners who supported, organized in micro groups, and worked together to achieve predetermined goals; offered learners multiple opportunities to be involved in their training, to freely express their ideas and opinions and to compare them with those of their colleagues to develop skills;

And focused on how information is processed assimilated, structured, interpreted, and used in various situations and how transfer takes place in practice.

Statistical tests of significance show that there is a significant difference at the 10% threshold of 4.95 points between the average scores of two groups. On the basis of these different results, the hypotheses of this research are clearly confirmed. The validation of these hypotheses provides a systematic basis for suggesting that the objectives are also being met. However, we must not lose sight of the limitations of learner-centered teaching strategies and the results of this research.

These strategies create an educational environment characterized by apparent disorder, a long course, the assimilation of false information in the absence of close supervision by the teacher, and the encouragement of passivity in some learners. The tasks given are not distributed/clearly defined in the absence of a follow-up group. There may be the possible development of a group of dependencies in task resolution, exacerbation of conflicts between learners when the teacher acts as a mediator, and the generation "group thinking", a superficial approach to workload, and difficulties in identifying and assessing individual progress.

Furthermore, external validation of the results of this research is difficult. The problem of generalizing the results of a scientifically evaluated randomized experiment seems essential insofar as it reveals a certain number of ambiguities. On the one hand, there is the generalization of the researcher "controlled" by criteria that may or may not allow the conclusions to be extended beyond the restricted field of the experiment. On the other hand, the generalization of the decision-maker of educational policy can extend an experimental device over the entire territory.

In addition, the number of participants in the project is an important limitation that has a number of consequences. The number of learners was approximately 384 individuals. This sample size (384) did not allow for conditions for the reproducibility of the results. As a result, in each institution, only two groups were created for the research profile. This sample size (384 learners) constitutes a limit in the representativeness of the results. It is essential to repeat these experiments on a larger scale, with a larger number of groups, to ensure the reproducibility of the results and better statistical significance. However, despite the indicative nature of the results, trends were identified that are consistent with the literature and (socio-) constructivist theory.

## Conclusion

This research was based on learner-centered teaching strategies. The objective of this research work was to assess the impact of these strategies on students' understanding of economic concepts. This study was based on a methodological approach that aimed to collect both qualitative and quantitative data. Propensity score double difference analysis was used to estimate the impact of these teaching strategies on the understanding of economic concepts using a combination of three data collection techniques. The results indicate that learners who were taught with these strategies scored an average of 10.81, while those who were not scored 5.86.

The applied statistical test shows that the difference in average scores between the two groups is significant at the 10% threshold. These strategies are a response to traditional teaching methods. In addition to compensating for the shortcomings of traditional teaching procedures, these new systems tend to be more stimulating and motivating for learners. This increases the learners' level of attention and contributes to improving their understanding and, therefore, their economic performance. The learner-centered teaching strategy is an effective approach that economics teachers need to integrate into their teaching if they are to achieve better results.

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