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Flipped Learning Approach as Educational Innovation in Water Literacy

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Abstract: Water literacy has become a fundamental aspect in today's society, as its conservation, preservation and management is key to ensuring human survival. The purpose of this paper was to analyze the effectiveness of flipped learning methodology on a traditional training practice in water literacy at the first level of secondary education. The flipped learning method consisted in providing the contents to the students before the class sessions, encouraging an active learning. A descriptive study was adopted with two experimental groups, two control groups and only post-test. An ad hoc questionnaire was used as an instrument to measure the parameters: Socio-educational, Motivation, Interactions, Autonomy, Collaboration; Deepening of contents; Problem solving, Class time and Ratings. The final sample was composed of 120 students, divided into four groups of 30 students each. The application of the treatment in the experimental groups lasted 10 sessions of 55 min. The results indicate that the use of time in class, the autonomy and the deepening of the contents were the aspects that improved most with the flipped learning approach. However, no significant differences in ratings were found. Finally, the main findings and their implications for water literacy are discussed.

Keywords: flipped learning; water literacy; water education; Likert scale; education research

1. Introduction

In recent times, the environment has been involved in a number of problems, which have increased alarmingly, and eliminate them or reducing their consequences is a complex undertaking to [1]. Among these problems are deforestation, climate change [2], the disappearance of species, and water scarcity and pollution, which affect our social development and our lives [3]. Currently, the most powerful tool we have to mitigate all this is Environmental Education [4]. If we specifically analyze the formation of students in relation to water, which is a necessary resource for life and social progress [5], we must propose actions that lead to reflection on the origin of this resource [6], those responsible for it and the actions that influence it, and the acquisition of skills that allow us to establish and develop solutions to this resource [7]. In this case, teaching and learning processes must also make students aware of water problems in all their dimensions [8], providing them with knowledge that allows them to understand and address the problems at the local, national and global levels [9]. Therefore, curricular elements in the area of water education should be oriented towards understanding the spatial and temporal dynamics of water [10], identifying its different uses [11], learning to conserve water [12], promoting actions that allow for better water use [13], assimilating the unequal availability of water at the global level [14], and raising awareness about the importance of natural resources that store and conserve water [15].

1.1. Water Awareness and Teaching in Learning Spaces

Awareness of water use is growing by leaps and bounds in educational systems around the world [16] due to the lack of water in certain parts of the planet [17]. The main reasons focus on drought [18], increasing pollution [19] and misuse of this natural resource [20]. Given this circumstance, Environmental Education, as an educational element, is beginning to be based on the management of water resources to make societies aware and make them active participants in actions related to environmental issues [21], oriented towards sustainable education [22]. Such is its importance that the United Nations (UN) Sustainable Development Agenda 2030 places water as Sustainable Development Goal (SDG): “SDG #6. Clean water and sanitation” [23]. Therefore, the state of water has become a goal and a challenge to be faced in the coming years.

On the other hand, in recent years there has been widespread criticism, especially in educational policies and in the processes of teaching and learning [24], in relation to teaching on the environment, with emphasis on the preservation and care of water establishing itself as a proposal for the development of critical learning environments that make students aware of its importance [25]. The literature reveals that there is a relationship between the daily reality of household water use and the perception of its rational use [26]. In many cases, the use of didactic books that deal with the subject of water can pose substantial verbal or epistemological obstacles to adequate training [27]. For this reason, innovative educational practices are beginning to be implemented for the teaching of this content [28]. These training practices aim to make learning a pleasant and meaningful process, as well as valid for students [29]. These practices include the use of social networks [30], online learning platforms [31], gambling [32,33], problem-based learning [34], project-based learning [35], inquiry-based learning [36], or even through the use of technological tools, such as spreadsheets [37], or the use of GLOBE educational programs, which are based on environmental measurements, research and communication through ICT [38].

1.2. Particularities of Flipped Learning in Today's Education

Flipped learning is one of the new teaching methodologies that have emerged as a result of the constant updating of the educational field. It is understood as a teaching method of hybrid character, where the presential performance is merged with the digital one [39]. The flipped classroom is a pedagogical model that goes beyond certain pedagogical actions, such as the learning of theoretical contents, outside the classroom, and makes use of the time of the class to develop and promote, in a practical way, through questions, discussions or work dynamics, the acquisition of the contents acquired outside the classroom [40]. This method mixes direct instruction, developed in a traditional way through the expository method, with constructivist actions, which provokes a change in the roles of those involved in the teaching and learning process [41] (Table 1). This methodology is becoming popular as a teaching approach, being applied at various levels of education and achieving good results [42]. The basis of flipped learning is focused on the empowerment and optimization of the time that the student is in the classroom, in order to increase the different interactions (teacher–student, student–student, student–content), the promotion of problem solving and the possibility of deepening the contents [43]. This is based on the previous knowledge, concerns and needs of the students [44–46]. This is intended to be visualized by students before they arrive in the physical classroom [47–49]. Firstly, students anywhere and from any device with an Internet connection can access and view digital content. Later, in the classroom, this content is treated in depth and the doubts generated are resolved. This makes better use of the time spent in the classroom [50,51].

The transformation experienced by flipped learning, both in the teacher’s performance (guide and counselor) and in the student’s role (main protagonist), has led to the benefit of various academic indicators such as motivation [52], the attitude taken towards the completion of tasks [53], the commitment towards the achievement of objectives [54], the different interactions between agents and content [55,56], the active participation of the student [57], the collaboration and socialisation between the figure of the teacher and the student and between the students [58,59], the degree of

autonomy acquired during the practice of training activities [60] and the adaptation to the educational needs of each student, encouraging individualised learning [61]. These potentialities cited have a direct and positive impact on student performance [62], closely linked to the improvement of ratings obtained [63,64]. This favours a higher degree of acquisition of objectives and competencies in students, as a consequence of the use of this model [65–67]. The impact literature includes research on the state of the art that certifies the effectiveness achieved by flipped learning in comparison with traditional teaching styles in which no technological resources are used [68–71].

Table 1. Comparison between expository method and flipped learning.

Periods	Expository Method	Flipped Learning
Before class	The students can read something about the educational contents to be dealt with, while the teacher prepares the theoretical presentation of the contents.	Students visualize the explanations of the contents to be worked on in class previously prepared by the teacher. The teacher generates and prepares practical activities and class dynamics.
During the class	The student listens to the teacher's theoretical explanation. The teacher has an active attitude, while the student is passive.	The student develops dynamics and practical activities during the class. The teacher supervises, advises or corrects the actions developed by the students. The student has an active attitude, while the teacher is passive.
After class	The students elaborate the activities that have been presented in class, after the theoretical explanation. The teacher continues to prepare theoretical presentations.	Students reinforce what they have learned in class by putting into practice the activities developed and analysing the theoretical videos on the contents covered. The teacher continues to prepare explanatory videos and work dynamics to develop in class.

1.3. Definition of Study Dimensions

This research will focus on the study of various dimensions such as Socio-educational, Motivation, Interactions, Autonomy, Collaboration, Deepening of contents, Problem solving, Class time and Ratings. The choice of these dimensions is justified in the analysis of previous works reported from the impact literature where the influence caused by the application of flipped learning is studied in the aforementioned dimensions and in various contents, subjects and educational levels [68,72,73]. Therefore, to follow the path taken in previous research, we chose to analyze a dimensional set used by various experts in the field of flipped learning.

To facilitate the understanding of the results presented in this research, a definition of each of them is established:

- Socio-educational: Articulates social variables related to gender, age, city, nationality and educational variables such as the course, learning difficulties, training methodology and technological resources used.
- Motivation: Reflects the level of motivation of the students during the realization of the training actions proposed by the teacher.
- Interactions: Shows the different types of interactions that can occur in learning spaces, such as the interaction between the teacher and the students, between the students and the content of the teaching and between the students themselves.
- Autonomy: Reveals the level of autonomy achieved and the individual abilities of the students in the different activities proposed.
- Collaboration: The level of teamwork done by students in the different learning tasks.

- Deepening of the contents: The level at which teachers work (deepens and makes a greater dedication) in the didactic content that will be taught according to the teaching and learning methodology used.
- Problem solving: Shows the student's level of ability to solve the problems raised by the teacher in the proposed training activities.
- Class time: The use of class time to work the contents programmed by the teacher and that the student must assimilate in the classroom.
- Ratings: The marks reached by the students in the different evaluation tests performed to verify the assimilation of the contents.

2. Justification and Objectives

The use of an innovative training approach promotes the inclusion of educational technology in learning spaces. This allows us to put into practice the new principles of education of the new millennium, giving greater prominence to the figure of the student and the use of the different technopedagogical resources that are emerging every day and whose access to the educational field cannot be denied [74]. This research is postulated as a continuity of previous works reported from the impact literature of recent years that have demonstrated the effectiveness of flipped learning in training processes [15,17–19,45–48]. This effectiveness is produced by contrasting flipped learning with a traditional methodology, where the teacher is the only source of information and it is transmitted in an expository way [75]. The reason why this study was placed in the Secondary Education stage is because of the familiarization with technology available to students in this age range [76]. In this way, the possible bias and typical error in experimentation is reduced, as students have to have certain skills to access, visualize and assimilate the contents digitally.

On the other hand, the general objective of the research was to analyse the effectiveness of the flipped learning methodology on a traditional training practice in the first level of Secondary Education. From this statement, the following objectives are extracted with a greater degree of concreteness: (i) to determine the degree of motivation, (ii) to determine the level of interaction (teacher–student, student–student, student–content), (iii) to find out the degree of autonomy, (iv) to discover the level of collaboration, (v) to declare the degree of deepening of the contents, (vi) to determine the level of problem solving, (vii) to find out the degree of class time, and (viii) to determine the variation of ratings.

Finally, the research questions that guided the study were:

RQ1. Does the flipped classroom method improve students' learning dimensions in water literacy?

RQ2. Are there significant differences in the different study variables between the control and experimental groups after the application of the flipped classroom method?

3. Method

This study was developed at a quantitative level through a descriptive and correlational approach taking into account the considerations of the experts [77,78] and previous research that has followed this research process [79].

In the present study, two types of groups (control and experimental) were established to carry out relationships between study variables for a single population of students the experiment. The difference stipulated between the two groups was methodological. The control groups received training in the traditional way, without any use of technological resources. The experimental groups followed an innovative methodology through flipped learning for the teaching of the contents. In this way, the methodological approach used was configured as an independent variable and the effectiveness achieved in the different established dimensions was configured as a dependent variable.

3.1. Design and Participants

A descriptive approach was adopted with 120 students in the subject of Natural Sciences in the first year of Secondary Education. According to impact studies reported in the specialized literature, for this type of research, sample size is not a determining factor for making comparisons of a single population of students [80,81].

Of this group of selected students, 67.5% are boys and the rest girls with an average age of 13 years ($SD = 1.42$). These participants were grouped into four study groups as the school has four groups of students for the first level of Secondary Education. Moreover, two were of a control nature and two were of an experimental nature. Treatment allocation was established on a randomized basis. Therefore, a design with two experimental groups, two control groups and only post-test was adopted (Table 2). Although no pretest was done to check the groups' starting level, the groups were comparable. These groups had the same level, since they were first-year students in Secondary Education, where the natural groups were composed of students with the same abilities who were entering, for the first time, the educational stage of Secondary Education and specifically, the subject of Natural Sciences. Therefore, the students had no previous knowledge about the didactic unit of awareness and preservation of water as an exhaustible natural resource.

Table 2. Research design.

Group	<i>n</i>	Composition	Pretest	Treatment	Posttest
1-Control	30	Natural	-	-	O ₁
2-Experimental	30	Natural	-	X	O ₂
3-Control	30	Natural	-	-	O ₃
4-Experimental	30	Natural	-	X	O ₄

Note. Treatment was randomly assigned.

The preparation of the sample was done by means of a sampling for convenience by virtue of the easy access to the different participants. This sample configuration technique was applied in an educational centre in the Autonomous City of Ceuta (Spain).

The selection of this context is justified by the cultural variety and territorial and social peculiarities of Ceuta, a border city between two countries (Spain and Morocco) and two continents (Europe and Africa) [82,83]. This contextualization allowed to reach a differentiating shade with respect to previous studies in which the effectiveness of a methodological contrast has been verified.

3.2. Instrument

An ad hoc questionnaire was designed based on previous studies [15,46,76,84,85] focusing on variables that are relevant to the development of teaching methods associated with flipped learning, as observed in several previous studies on this teaching method [27–44]. This instrument consists of 35 questions catalogued in nine dimensions (Socio-educational, Motivation, Interactions, Autonomy, Collaboration; Deepening of contents; Problem solving, Class time and Ratings). The presentation of the items is clarified by a four-level Likert scale (from 1 = None to 4 = Completely).

For content validity, the Delphi method was used with the purpose of knowing, from a qualitative point of view, the opinion of various experts ($n = 8$). These specialists expressed a positive opinion ($M = 4.64$; $SD = 0.37$; $\min = 1$; $\max = 6$) and offered recommendations for optimizing the instrument. These focused on unifying items in the same category to reduce the total number of questions and modifying several words to improve understanding of the items. This feedback was done, on the one hand, with the intention of not presenting an instrument with a large volume of questions that lead to saturation and frustration of the participants and, on the other hand, to adjust the lexicon to the level of the students and not to cause bias due to lack of understanding of the items. To complement this first validation, two statistical procedures were applied as Kappa by Fleiss and W by Kendall to

obtain the degree of agreement and relevance of the judgments issued by the specialists. In these tests, appropriate values ($K = 0.84$; $W = 0.86$) were reached which verify the relevance of the experts' opinions.

The validation of the construct was carried out from the exploratory factorial analysis by means of the principal components method and a varimax rotation. The Bartlett's test of sphericity revealed dependence between the established variables (2613.28; $p < 0.001$) and the Kaiser–Meyer–Olkin test offered optimal values that certify the adequacy of the sample ($KMO = 0.87$).

For the reliability of the questionnaire, several statistics were found, such as Cronbach's alpha (α) (0.86), Compound reliability (0.84) and Mean variance extracted (0.81). Scores that confirmed the internal consistency of the instrument applied were obtained.

3.3. Procedure and Data Analysis

The study carried out had different phases of research. First, the sample was selected. For this first action, the researchers met with the school in order to develop the study and access to the student sample. The school in question showed complete agreement to carry out the study, which facilitated both the sample selection phase and the training and completion of the instrument. Thus, the informed consent of the participants was obtained.

Then, a didactic unit composed of 10 sessions of 55 min each was carried out, where the different contents related to the subject of awareness and preservation of water as an exhaustible natural resource were taught. The contents were: (a) water as a vital resource; (b) responsible use of water; (c) measures to promote reasonable use of water; (d) consequences of its depletion; (e) alterations caused by climate change.

This didactic unit was developed through two different methodologies according to the study group (Control = traditional method without the use of ICT; Experimental = flipped learning). Specifically, the control groups focused the didactic approach on a traditional transmission of the contents through the master class. The teacher's role was to prepare audiovisual material and upload it to a content management platform so that students could view it prior to the face-to-face session. Thus, the students came to the classroom with the content they had seen. This action helped to allocate more class time to resolve doubts about the content taught digitally and to delve into other aspects of the subject. Once the unit was completed, the data collection process took place by means of the questionnaire. Finally, there was a statistical analysis that allowed the extraction of results and the subsequent establishment of conclusions in order to respond to the proposed objectives.

The statistical analysis was carried out with the Statistical Package for the Social Sciences (SPSS) v25 program (IBM Corp., Armonk, NY, USA). Basic statistics such as mean (M) and standard deviation (SD) were used. The trend in distribution has been determined by testing for skewness (S_{kw}) and kurtosis (K_{me}). The comparative study of the means between the groups was carried out with the t-Student test ($tn_1 + n_2 - 2$). The size of the effect achieved has been extracted with Cohen's d and the biserial correlation (r_{xy}). The statistical treatment was deployed taking a $p < 0.05$ as a statistically significant difference. In this conventional methodology, the teacher is a simple player of content transmitted in an expository way as the main relevant agent of the teaching and learning process. As for the experimental groups, a methodology based on flipped learning was followed. This contributed to certain educational potentialities that favoured access to information in a ubiquitous way, the advancement of contents before the face-to-face class and the change of roles between teachers and students, with the latter achieving an active, leading and socio-constructive perspective on knowledge.

4. Results

4.1. RQ1. Does the Flipped Classroom Method Improve Students' Learning Dimensions in Water Literacy?

In Table 3, the descriptive data were collected. The means achieved by both the control groups and the experimental groups in each of the variables studied are shown. In this case, it is reflected as the averages of the control groups did not exceed the average of 2.5. In contrast, in the experimental

groups this average is exceeded for all variables, except for student interaction with respect to content, which is below (2.3). In addition, the values of asymmetry and kurtosis showed a normal distribution, these being between -1.96 and $+1.96$ [86]. The standard deviation gives more equal results in all variables, except in the scores achieved for the control groups, and in the students' autonomy and content deepening in the experimental groups, where the students' responses were more dispersed. Kurtosis is platycuric in all variables, except in the interaction between students, which is leptocuric, and in the marked relationship between students and the proposed contents, which is mesocuric.

Table 3. Results obtained for the study variables in the control groups and experimental groups.

	Variables	Likert Scale $n(\%)$				Parameters			
		None	Few	Enough	Completely	M	SD	S_{kw}	K_{me}
Control groups	Motivation	5(16.7)	11(36.7)	12(40)	2(6.7)	2.37	0.850	-0.093	-0.594
	Teacher-student	7(23.3)	15(50)	8(26.7)	0(0)	2.03	0.718	-0.050	-0.954
	Student-content	8(26.7)	19(63.3)	3(10)	0(0)	1.83	0.592	0.040	-0.082
	Student-student	4(13.3)	18(60)	7(23.3)	1(3.3)	2.17	0.699	0.409	0.591
	Autonomy	15(50)	15(50)	0(0)	0(0)	1.50	0.509	0.000	-2.14
	Collaboration	7(23.3)	14(46.7)	6(20)	3(10)	2.17	0.913	0.523	-0.298
	Deepening	19(63.3)	11(36.7)	0(0)	0(0)	1.37	0.490	0.583	-1.78
	Resolution	8(26.7)	18(60)	4(13.3)	0(0)	1.87	0.629	0.098	-0.321
	Class time	23(76.7)	7(23.3)	0(0)	0(0)	1.23	0.430	1.32	-0.257
Ratings ^a	6(20)	10(33.3)	9(30)	5(16.7)	2.43	1.01	0.086	-0.991	
Experimental groups	Motivation	0(0)	9(30)	13(43.3)	8(26.7)	2.97	0.765	0.058	-1.23
	Teacher-student	3(10)	9(30)	15(50)	3(10)	2.60	0.814	-0.346	-0.169
	Student-content	4(13.3)	14(46.7)	11(36.7)	1(3.3)	2.30	0.750	-0.042	-0.312
	Student-student	2(6.7)	13(43.3)	9(30)	6(20)	2.63	0.890	0.196	-0.806
	Autonomy	5(16.7)	11(36.7)	7(23.3)	7(23.3)	2.53	1.04	0.101	-1.13
	Collaboration	1(3.3)	8(26.7)	12(40)	9(30)	2.97	0.850	-0.295	-0.724
	Deepening	5(16.7)	10(33.3)	8(26.7)	7(23.3)	2.57	1.04	0.007	-1.12
	Resolution	3(10)	9(30)	11(36.7)	7(23.3)	2.73	0.944	-0.208	-0.791
	Class time	0(0)	8(26.7)	8(26.7)	14(46.7)	3.20	0.847	-0.409	-1.49
Ratings ^a	3(10)	11(36.7)	11(36.7)	5(16.7)	2.60	0.894	-0.012	-0.648	

Note. ^a = Score achieved in the assessment test (None: 1–4.9; Few: 5–5.9; Enough: 6–8.9; Completely: 9–10).

4.2. RQ2. Are There Significant Differences in the Different Study Variables between the Control and Experimental Groups after the Application of the Flipped Classroom Method?

The comparison of means between the control groups and the experimental groups with respect to the variables applied in the study showed a higher mean in all the variables of the group where the flipped learning teaching method is applied with respect to the traditional method. The biggest differences are shown in the student's autonomy and the deepening of contents, where the distance is substantial. The smallest difference is in the ratings achieved by the students (Figure 1).

To establish the value of independence of the data collected between the traditional teaching method and the flipped learning method, the Student's t -test for independent samples was applied. The results indicate that there were significant differences in Motivation, interactions Teacher–Student and Student–Content, Autonomy, Collaboration, Deepening, Resolution and Class time, given that their p -value was below 0.01, and in the relationship given between the students, where the correlation was <0.05 . However, in the ratings reached by the students, the difference was not significant either in the t -value or in the biserial correlation, which shows that the flipped learning method increased the value of all the variables analyzed, except in the ratings where there was no direct incidence. The strength in the association of the variables by means of the biserial correlation, offered a greater effect in the autonomy of the students, the deepening of the contents and the use of the time during the development of the pedagogical actions, due to the fact that its values were above 0.5. In the rest of the variables where there had been a relationship of significance, the force of association is average. If we

consider the value offered in all the variables, the size of the effect offered by Cohen’s statistician *d* was small in all cases (Table 4).

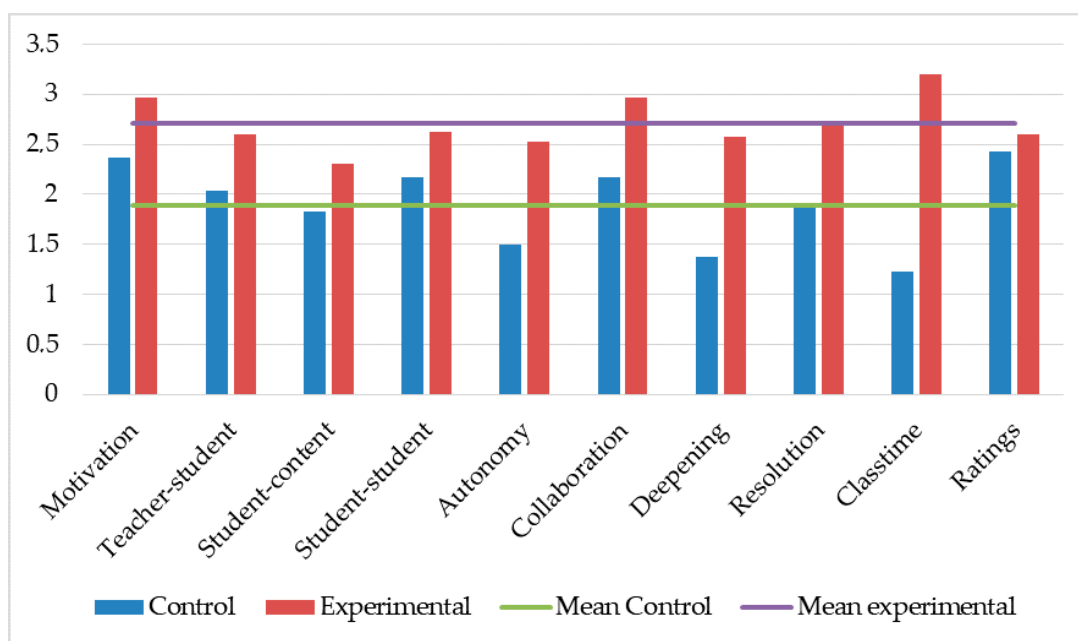


Figure 1. Comparison between control groups and experimental groups.

Table 4. Value of independence between the control groups and the experimental groups.

Variables	$\mu(X1-X2)$	$t_{n1+n2-2}$	<i>df</i>	<i>d</i>	<i>r_{xy}</i>
Motivation	-0.600(2.37–2.97)	-2.873 **	58	0.032	0.353
Teacher-student	-0.567(2.03–2.60)	-2.859 **	58	-0.023	0.352
Student-content	-0.467(1.83–2.30)	-2.676 **	58	-0.013	0.331
Student-student	-0.467(2.17–2.63)	-2.259 *	58	-0.036	0.284
Autonomy	-1.033(1.50–2.53)	-4.883 **	58	0.081	0.540
Collaboration	-0.800(2.17–2.97)	-3.512 **	58	0.000	0.419
Deepening	-1.200(1.37–2.57)	-5.717 **	58	0.173	0.600
Resolution	-0.867(1.87–2.73)	-4.184 **	58	-0.049	0.481
Class time	-1.967(1.23–3.20)	-11.34 **	58	0.293	0.830
Ratings ^a	-0.167(2.43–2.60)	n.s.	58	0.044	0.089

Note. ** = The correlation is significant at the 0.01 level; * = Correlation is significant at the 0.05 level; n.s. = Not significant; ^a = Score achieved in the assessment test (None: 1–4.9; Few: 5–5.9; Enough: 6–8.9; Completely: 9–10).

5. Discussion and Conclusions

The data collected in this study showed that all the means obtained in the nine dimensions were superior in the experimental groups. Therefore, the development of different skills, such as student motivation and engagement, was confirmed with the application of flipped learning compared to the traditional method in water education [67–69]. At the same time, data were obtained that indicated that the flipped learning approach collected that the socio-educational dimension was greater, as indicated by other authors [53,54,56,60]. There was an increase in motivation [51] and increased teacher–student, student–student and student–content interactions [46–48,54]. An increase in student autonomy was also found [43–45,59], as well as greater collaboration among students [57,58]. There was a deepening of content and a greater willingness to solve problems autonomously [42]. Class time was improved [48,49] and ratings were slightly higher [61–63].

However, the biggest differences were found in the autonomy of the students and in the deepening of the contents. Thus, with the application of flipped learning, significant learning was encouraged in the students. However, there were no significant differences in the scores, although the average was higher in the experimental groups. These findings are related to the good results that flipped learning is obtaining in other contexts [39–41].

On the other hand, the use of time in the classroom was the greatest average and main benefit, which directly affects student learning [52], due, in the first instance, to the ease of access to content from home [64]. Thus, in the case of the experimental groups, the time in the classroom was used to share the knowledge acquired individually with the whole group, to solve doubts and problems. This had a direct impact on water literacy. Likewise, the use of innovative methodologies that allow a greater understanding in the teaching of key aspects, such as water, is fundamental, since it will determine the way of life in the coming years [27,28]. At the same time, it is essential that learning be meaningful in order to generate ecological awareness in students [21].

In short, this paper analyzed the effectiveness of the flipped learning methodology on a traditional training practice in water literacy at the secondary education stage. All this was favored by the change of roles between the different educational agents. The teacher assumed a passive role, leaving all the prominence and main activity to the student, who, through the viewing of the audiovisual materials and the collaboration with other students, carried out a teaching and learning process that proved to be beneficial to solve the problems and perform the activities proposed by the teacher, in a climate of collaboration to achieve together the construction of knowledge on the subject. The main finding obtained was the evidence on the improvement of student motivation and engagement through flipped learning. These data are relevant to water literacy, with a flipped learning being an approach that produces a greater understanding of the content.

The limitations of the study include the cross-sectional nature and convenience sampling. Furthermore, this study was conducted in a specific population and there may be limitations in generalizing the results outside that population. In future studies, this design should be replicated in other contexts to compare the results obtained with those obtained in this paper.

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