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Health Profession Students Value Active Teaching, Learning and Assessment Methods for the Learning of Complex Academic Skills

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Abstract

Given that globalization leads to changes in information and knowledge transmission, there is a need for updating and investing in new teaching and assessment methods. Transverse descriptive study analyzed perceptions of Active Methods. Concept maps using Flipped Classroom, Movie-Based Learning, Reflective Portfolios (Active Methods) and lectures and standardized tests (Traditional Classroom) were combined in the 4th and 5th semesters in the Health Policy course of the Federal University of Viçosa (UFV) with 226 students. At the end of each semester, students completed a survey designed specifically to capture students' perceptions of the effect of the various teaching methods on the learning of complex academic skills. Active Methods were perceived by students as an effective contribution to learning, teamwork, feedback, criticism, reflection, and assimilation of content when compared to the traditional teaching methods.

Movie-Based Learning was best evaluated (median 3.67), followed by the Reflective Portfolio (median 3.50) and Flipped Classroom and Concept Map (median 3.38), while lectures and standardized tests obtained the lowest median (2.75). The use of Active Methods in a health profession course was valued by the students for the learning of complex academic skills.

Introduction

The phenomenon of globalization has increasingly driven changes in the process of Teaching, Learning and Assessment, which at the university level means training for the exercise of complex skills (knowledge, skills and attitudes) (Cotta & Costa 2016, Cornalia 2012). This world in constant change requires the training of students and future health professionals, so they are able to work in an interprofessional way in different contexts, practices and with different stakeholders.

Thus, there is a need for teacher and student development, with training for the application of active and reflective methods, surpassing traditional teaching and learning methods (Cotta & Costa 2016, Tekian 2017, Philibert 2019, Rivière 2019, Alberti 2018).

Nevertheless, the Traditional Classroom, based on the banking education model and memorization, is still quite prevalent in universities, partly justified by its historical consolidation, maintaining the hierarchy of knowledge transmission in a vertical way, in which teachers are the content depositaries and students the receptacles (Freire 1987, Blanco 2009, Rezende 2019). Thus, it is necessary to implement profound changes in the teaching, learning and evaluation paradigm, transcending the technicist-positivist model (Traditional Classroom) to models based on active participation (Active Methods), whose reference paradigm is critical-reflective (interpretive) (Roget 2014).

In this context, different active Teaching, Learning and Assessment methods aim to give agency to students by stimulating critical, reflective, creative and caring thoughts, enabling them to make decisions when facing concrete situations in the real world, encouraging the exercise of autonomy and empowerment.

As a result, the need for restructuring teaching and learning methods to prepare students for dynamic scenarios both within the university, as well as in communities and workplaces is highly relevant (Cotta & Costa 2016). Studies have shown that Active Methods have the potential to facilitate learning and increase students' knowledge, in addition to improving perception and satisfaction with the teaching, learning and evaluation process (Rezende 2019, Fida 2018, O'Brien 2016, Jung 2017, Nouri 2016, Corkin 2017). However, in many institutes, Active Methods of teaching and learning are often combined with traditional learning methods and summative assessments, indicating a need for studies that analyze and compare, simultaneously, the perception and performance of students in the two types of classrooms: the traditional and the active and between methods.

The objective of this study is to evaluate the performance and perception of undergraduate students in Nursing, Medicine and Nutrition at a public university on active classroom-based learning (Reflective Portfolio, Conceptual Map associated with the Inverted Classroom and Cines-Based Learning) and traditional classroom-based learning (lectures and exams).

Materials and Methods

Setting

Health Policy is a course offered twice a year to Nursing, Medicine and Nutrition students every six months at the Federal University of Viçosa. The course employs both Active Methods (60%) and Traditional Teaching, Learning and Assessment Methods (40%).

Each class had approximately 60 students. The students were divided into small groups (average 5-7 students per group) at the beginning of the semester for activities related to Reflective Portfolio, Concept Map with Flipped Classroom and Movie-Learning (Active Methods). Activities related to Traditional Classroom (lecture and exams) were performed individually.

Design

This transverse descriptive study analyses student's evaluations on the Teaching, Learning and Assessment activities using a specifically designed Questionnaire after participating in a Health Policy course throughout a semester.

Every student is exposed to the various Traditional Teaching, Learning and Assessment activities: Reflective Portfolio, Concept Map with Flipped Classroom and Movie-Learning (Active learning) and lectures and standardized assessment (Traditional Classroom). In the course, traditional teaching formats such as lecturing and standardized testing were present as well. Students were exposed simultaneously to different kinds of methods of teaching and learning and were able to compare and evaluate Traditional and Active Methods.

After the course is ended, students complete the survey with their evaluation on the various teaching and learning methods.

Participants

By the end of each semester, we offer a paper version of the Questionnaire to every student to evaluate the learning methods that were applied. They answer the Questionnaire voluntarily. This Questionnaire is handed out and collected again on the same day.

Of the 232 students approached, 226 answered the Questionnaire, of Nursing (54%), Medicine (2%) and Nutrition (44%) students, who took the Health Policy class from the first semester of 2016 to the first of 2019. 190 (84.1%) students were female and 36 (15.8%) were male.

Four students who did not answer at least one question from the Questionnaire were excluded from the study. The response rate was 98.23%.

Development and Completion of the Questionnaire

A group of health educators of UFV designed a questionnaire, which was named Student Perception Assessment Tool – SPAT (Student Perception Assessment Tool, see Additional file 1) using competency learning approaches defined by the National Curriculum Guidelines of Brazil (Brasil, 2017), and by international guidelines (Cotta & Costa 2016, Dolan 2018, Lipman 2016, Hawkins 2015, Prado 2015, Lizarraga 2010). The SPAT surveys student's evaluations on building Active Methods and how that influenced their acquisition of academic skills.

The Questionnaire consists of 36 items based on the Likert scale allowing students to identify the level of agreement from 4 propositions in ascending order, ranging from Totally

Disagree (1) to Totally Agree (4). The statements were established in view of the skills to be exercised and learning objectives. The questions related to the four methods: Reflective Portfolio (questions 1 to 14), Concept Map associated with Flipped Classroom (questions 15 to 22), Movie-Based Learning (questions 23 to 28), and Traditional Classroom (questions 29 to 36). A pilot study of SPAT was carried out, in which the SPAT was tested, evaluated and modified in a consensual way during two academic semesters (prior to 2016) with classes of the discipline of Health Policies that were not included in the present study. The pilot study aimed to review and direct aspects of the investigation, in addition to identifying problems in the understanding and construction of statements. In the pre-test, the respondents' reactions were observed, questions considered ambiguous and conflicting, in addition to the time spent by students to answer the questionnaire. After the identification of the practical difficulties of the questionnaire, we corrected questions that were incorrectly formulated or whose sequence was not adequate in order to obtain the final version of the instrument (Richardson 2012). Thus, undergraduate students tested this instrument, contributing to its adaptation and corrections.

For the purpose of this study, at the end of each semester, the students were asked to anonymously complete the SPAT. The SPAT was applied in the 4th and 5th semesters over a four-year period (2016–2019), corresponding to six semesters and a total of 226 students.

The overall reliability of the Questionnaire was calculated using Cronbach's alpha coefficient and was found to be 0.917. More specifically, Reflective Portfolio, Concept Map with Flipped Classroom, Movie-Based Learning and Traditional Classroom had an overall reliability of 0.930, 0.885, 0.901 and 0.912, respectively. All these values are considered very high (from 0.81 to 1.00) according to the scale proposed by Prado (Hawkins 2015).

Lastly, as the design of this study is bound to the acquiescence bias, some efforts were made to avoid it. Rating scales are one common method to reduce acquiescence bias, and that is the reason for introducing the Likert scale on the questionnaire, divided equally between affirmative and negative statements. Also, how these statements are written makes an important difference. As listed by previous studies, avoiding referring to ethical statements, polarizing them to a "good" and "bad" point of view, avoiding using vague concepts, using clear language and minimizing the length of the Questionnaire are some strategies that were also used to minimize this bias (Krosnick 20019, MacKenzie 2012).

Adding to that, it is stated that students that understand that their role is important while answering the Questionnaire a strategy to motivate respondents to answer in a more truthful way, as well as assuring the confidentiality of their answers. This strategy is present in this Questionnaire as well (MacKenzie 2012).

Avoiding the acquiescence bias is very important to assure the truthfulness and reliability of this study, and these strategies were carefully introduced in this stage of the development of the study design.

Description of the Teaching, Learning and Assessment Activities

In the Traditional Classroom, the teaching and learning process occurs through lectures aimed to transmit knowledge. Students receive and memorize the contents (cognitive learning) of the lecture and are subsequently evaluated through tests. The method is based on the technicist-positivist education model. In this model, assessment summative assessment is performed at the

end of a module or course. This type of assessment compares, categorizes and classifies students and mainly focuses on the final results than the path taken by students during the teaching and learning process (Cotta & Costa 2016, Roget 2014). The assessment of the teaching and learning activities of the lectures (Traditional Classroom) was conducted by using two standardized tests (Multiple Choice Questionnaires) administered in the middle and end of the semester. According to Cotta & Costa:

> Portfolio is a didactic and innovative method of teaching, learning, investigation and active evaluation that aims at stimulating the construction of knowledge based on an autonomous, creative and responsible approach, thus representing a permanent and continuous process of knowledge acquisition. The portfolio must be dynamically structured and defined according to well-delineated objectives to enable meaningful learning as well as formative and procedural assessment. Its structure should consist of clear and flexible topics, aiming at the exercise of competence, capable of stimulating autonomy, critical, reflexive and citizen spirit of the subjects in formation. (page 35, 2016)

In this study, the portfolio was a group assignment completed by a team of 5 to 7 students (collaborative learning), with formative assessment and assertive and timely feedback by teachers, which happened monthly through dialogues and in-person.

The Concept Map was developed as a graphical tool aimed at organizing and representing knowledge for greater understanding and assimilation of the subject of study (Novak 2008). The conceptual framework surrounding the use of Concept Maps is Ausubel's (1968) theory of meaningful learning, which proposes that knowledge must be: understood, significantly relevant and well-integrated for efficient learning. Thus, for meaningful learning to occur, it is essential that new concepts are integrated into the student's cognitive structure, interrelating them with pre-existing knowledge, thus facilitating the establishment of solid conceptual associations. Thus, Concept Maps, in undergraduate health courses, have an important teaching and learning potential, as they allow connections between the new and existing subjects and autonomous review of ideas and content organization (Cotta & Silva 2016).

In the Health Policy course, the Concept Map is built collectively by teams of 5 to 7 students (collaborative learning) and is based on the chapters of the reference book of the course, entitled "Health Policy: Designs, Models and Paradigms" (Cotta & Costa 2016). The CMapTools program was used to construct the Concept Maps. CMapTools is a free online tool that allows you to build and draw conceptual schemas. CMapTools enables the creation of boxes for key concepts and arrows that link one key concept to another through linking terms, thus forming propositions (one key concept, linked to another key concept by means of linking term (Costa & Silva 2016).

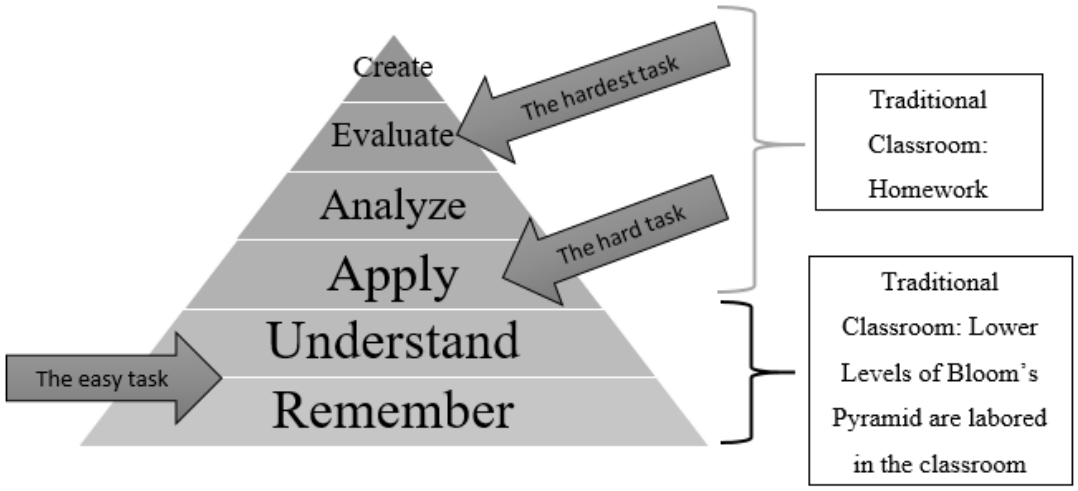
According to the precepts of formative assessment, a Concept Map is constructed and evaluated throughout the semester (six times in the classroom), followed by self-assessment by students and evaluation and feedback by teachers. At the end of the course, each group of students presents a single Concept Map containing all the course content, in this way, the

students incorporate new concepts and transform them in each moment (some key concepts become secondary as the students assimilate and integrate new concepts).

Flipped Classroom is a pedagogical approach where knowledge is facilitated prior to its application in the classroom (Chen 2017). Students study specific topics and content prior to the class and, in the classroom, they hold discussions with colleagues and perform activities and exercises under the instructions of a teacher. Subsequently, the teachers work on the difficulties and/or incorrect concepts, if necessary (Cotta & Ferreira 2019).

To understand the difference between traditional methodology and Flipped Classroom, we will hierarchically classify learning objectives based on the new revised Bloom Taxonomy structure proposed by Anderson et al. in 2001 (Anderson 2001). In relation to Traditional Classroom, the low categories of Bloom's Taxonomy (remembering and understanding) are precisely the easiest, and are performed in the classroom, in the presence of the teacher [Figure 1].

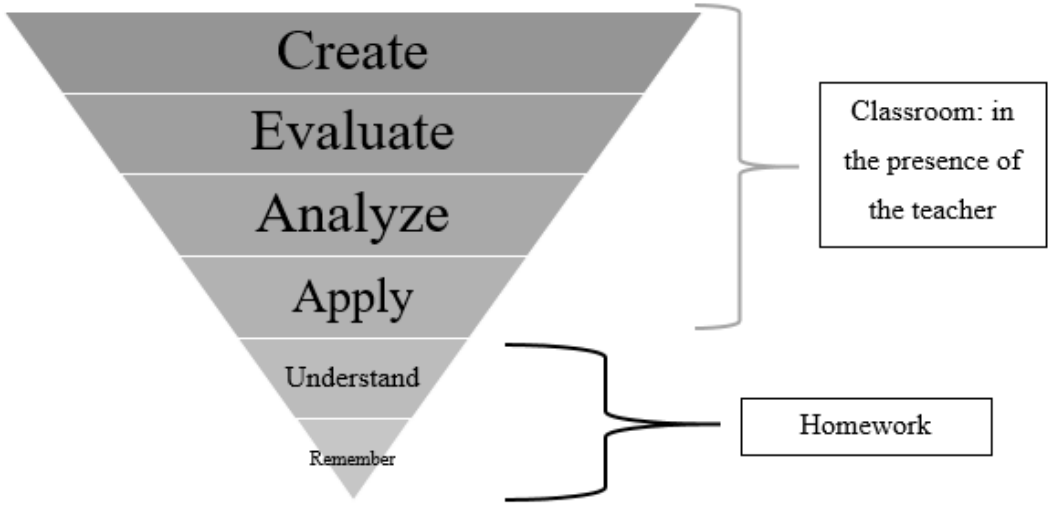
Figure 1: Traditional Classroom



Source: adapted from Bergmann, 2018

In the Flipped Classroom, the same low Bloom Taxonomy categories are delivered so that students individually study at home. In the classroom, under the guidance of the teacher, students perform the most complex cognitive processes (apply, analyze, evaluate and create) [Figure 2] (Bergman 2018).

Figure 2: Flipped Classroom



Source: adapted from Bergmann, 2018

Movie-based Learning

Movie-Based learning is a powerful method of teaching and learning. It mobilizes students' interest in certain current issues in a creative and innovative way, thus facilitating knowledge acquisition and the exercise of critical, reflective thinking (Ferreira & Cotta 2020).

Specifically, in the course under study, we worked with the following movies: *"To Sir, with Love,"* and *"The Substitute,"* aiming to represent the profile of 21st-century students, from the four pillars of education (learning to know, learning to do, learning to be and learning to live together); The movies *"Sicko"* and *"John Q"* aimed to present the different health systems in the world, provoking students to creatively reflect on the health consequences of a neoliberal model and its implications on the deterioration of universal, equitable and sustainable health policies such as the Brazilian Unified Health System (SUS). In small groups, students reflect based on theoretical and conceptual knowledge acquired in the course. They build posters, discuss real and hypothetical scenarios and practice role-play about subjects of Health Policy subjected by these movies (see Appendix). The synopses of the respective movies are presented in the Appendix.

Formative assessment is an essential component of Active Methods. According to the theory of formative assessment, the learning process of students needs to be monitored and assessed continuously, routinely and systematically (Rushton 2005, Sadler 2006). An essential aspect of formative assessment consists of self-assessment by students and assertive, longitudinal and timely feedback from teachers. In this manner, students understand their errors and are given the opportunity to assimilate guidelines and respond appropriately, outlining plans for corrections, recovery and attainment of desired skills (Fida 2018). Students received feedback in each moment while building the Concept Map (see Additional file 2) and the Reflective Portfolio ([see Additional file 3]). The assessment employed in the Active Methods was formative, occurring at various times

throughout the semester. It included timely feedback for correction and attainment of required skills, self-assessment by students and formative assessment by teachers.

Performance assessment

In addition to analyzing the student's perceptions through the answers to the questionnaires applied (SPAT), we also performed a performance analysis. This performance was evaluated at each stage of development of the active and traditional methods in which moments of construction.

During the school semester, the same contents are worked both in the Traditional Classroom and in the active classroom. The difference is the way they are approached from learning to evaluation (somative or formative), which allows us to compare which real learning was more effective. We measured the performance based on the entire teaching, learning and evaluation process of students throughout the school semester.

Data Analysis

We assigned values (scores) of 1 to 4 according to the answers provided for each method (1 - Totally Disagree, 2 - Disagree, 3 - Agree and 4 - Totally Agree). Categories 3 and 4 were joined because both categories are related to an agreement state and presented in relative frequency.

Based on the average of the answers, a score was calculated for each method. The median scores were used as a measure of central tendency, whereas interquartile intervals (25 and 75%) were used as a measure of dispersion of each method. To compare the evaluations of the students as regards the different methods, the Wilcoxon test was used, as the data were not normally distributed. We adopted a significance level of 5%. Statistical analysis was performed using IBM SPSS Statistics for Windows software, Version 23 (IBM Corp., Armonk, NY).

Results

Reflective Portfolios

Students' responses indicated that the Reflective Portfolio contributed to the exercise of the following skills, as indicated in Table 1.

Table 1: Evaluations on Reflective Portfolios

Proposition	Percentage (%)		
	1*	2**	3 + 4***
I consider the use of Tests relevant in the course as a method of Teaching, Learning and Assessment	2.2	6.2	91.6
Stimulated teacher-student and student-student feedback	0.9	5.8	93.3
Contributed to the study of the topics related to current Health Policies	0.4	1.3	98.3
Stimulated my reflective capacity as a university student and citizen	0.4	2.7	96.9

Stimulated my critical capacity as a university student and citizen	0.4	3.6	96.0
Stimulated co-responsibility for the Teaching, Learning and Assessment process	0.4	4.5	95.1

** Completely Disagree; ** Disagree; *** Agree + Completely Agree*

In addition, the median score of Reflective Portfolio was high, corresponding to agreement results (agree and totally agree) and the statements proposed by the questionnaire. We highlight the alternatives: *"Stimulated teamwork," "The construction of the Reflective Portfolio encouraged me to pay more attention, to understand and to argue about the current events of Health Policy in Brazil and the world," "Contributed to the study of current topics related to Health Policies"* and *"Stimulated teacher-student and student-student feedback,"* obtained a median value of 4.0, corresponding to the alternative *"Totally Agree."*

(1) Concept Map and Flipped Classroom

Students' responses indicated that Concept Map combined with the Flipped Classroom contribute significantly, as shown in Table 2.

Table 2: Evaluations on Concept Map and Flipped Classroom

Proposition	Percentage (%)		
	1*	2**	3 + 4***
I consider the use of Tests relevant in the course, as a method of Teaching, Learning and Assessment	0.0	7.1	92.9
Stimulated teacher-student and student-student feedback	0.9	6.7	92.4
Facilitated the assimilation of the course content	0.0	3.1	96.9
Facilitated the integration of the course content	0.0	4.0	96.0
Contributed to Meaningful Learning	0.4	5.9	93.7

** Completely Disagree; ** Disagree; *** Agree + Completely Agree*

(2) Movie-Based Learning

According to the frequency analysis, all statements regarding the Movie-Based Learning method obtained a high pass rate (above 81.0%) with answers between 3 and 4 points (Totally Agree and Agree, respectively), as indicated in Table 3.

Table 3: Evaluations on Movie Based Learning

Proposition	Valid Percent (%)		
	1*	2**	3 + 4***

I consider the use of Tests relevant in the course, as a method of Teaching, Learning and Assessment	0.4	2.3	97.3
Stimulated teacher-student and student-student feedback	0.0	16.8	83.2
Helped understand important issues regarding Health Policy	0.0	1.8	98.2
Helped reflect on important issues related to Health Policy	0.4	1.4	98.2
Contributed to Meaningful Learning	0.4	5.0	94.6
I felt motivated by the use of movies in the course	2.3	6.3	91.4

** Completely Disagree; ** Disagree; *** Agree + Completely Agree*

We highlight the high motivation expressed by the students through the statement *"I felt motivated with the use of movies in the course,"* corresponding to 91.4% of answers in agreement.

The median score corresponded to results of agreement (Totally Agree and Agree) with the statements proposed by the questionnaire. We point out that no student "totally disagreed or disagreed" with any statement.

(3) ***Traditional Classroom***

Regarding the Traditional Classroom, the median of the scores corresponded to the results of *"Agree"* and *"Disagree"* in the statements proposed by the questionnaire. We highlight the statement *"I was motivated by taking the tests,"* mostly evaluated in the statement "Disagree."

According to the frequency analysis, with the exception of the statement *"I consider the use of Tests relevant in the course, as a method of Teaching, Learning and Assessment,"* which had 85.4% agreement, the other statements referring to the Traditional Classroom obtained low scores as compared to the Active Methods (below 73,0%) with answers between 3 and 4 points (*Totally agree* and *agree,* respectively).

Results are shown in Table 4. We highlight the low frequencies of agreement found for the following statements about the tests (traditional assessment): *"Facilitated the assimilation of the course contents"* (71.6%); *"Acted as a facilitator of learning Health Policy content"* (57.3%); *"Contributed significantly to my learning"* (68.9%); *"Teacher-student and student-student feedback"* (55.6%); *"I was motivated to take Tests"* (42.2%).

Table 4: Evaluations on Traditional Classroom

Proposition	**Valid Percent (%)**		
	1*	2**	3 +4***
I consider the use of Tests relevant in the course, as a method of Teaching, Learning and Assessment	2.2	12.4	85.4
Stimulated teacher-student and student-student feedback	4.0	40.4	55.6

Facilitated the assimilation of the course contents	1.3	27.1	71.6
Acted as a facilitator of learning Health Policy content	3.6	39.1	57.3
Contributed significantly to my learning	4.0	27.1	68.9
I was motivated to take Tests	12.5	45.3	42.2

** Completely Disagree; ** Disagree; *** Agree + Completely Agree*

(4) Comparison of Methods

To compare students' evaluations of learning by each method of Teaching, Learning, and Assessment employed in the course, we calculated the medians of the Questionnaire in each method and compared them by the Wilcoxon test. This kind of statistical analysis requires each category present in SPAT to be analyzed and compared separately. The best-rated method was Movie-Based Learning (3.67), as compared to Traditional Classroom (2.75). In addition, Reflective Portfolio (3.50) and Concept Map with Flipped Classroom (3.38) were highly rated by the students. For the comparison between the methods employed, every Active Method was better rated than the Traditional Classroom ($p < 0.001$) (Table 5).

Table 5: Students' evaluations: comparison between Methods.

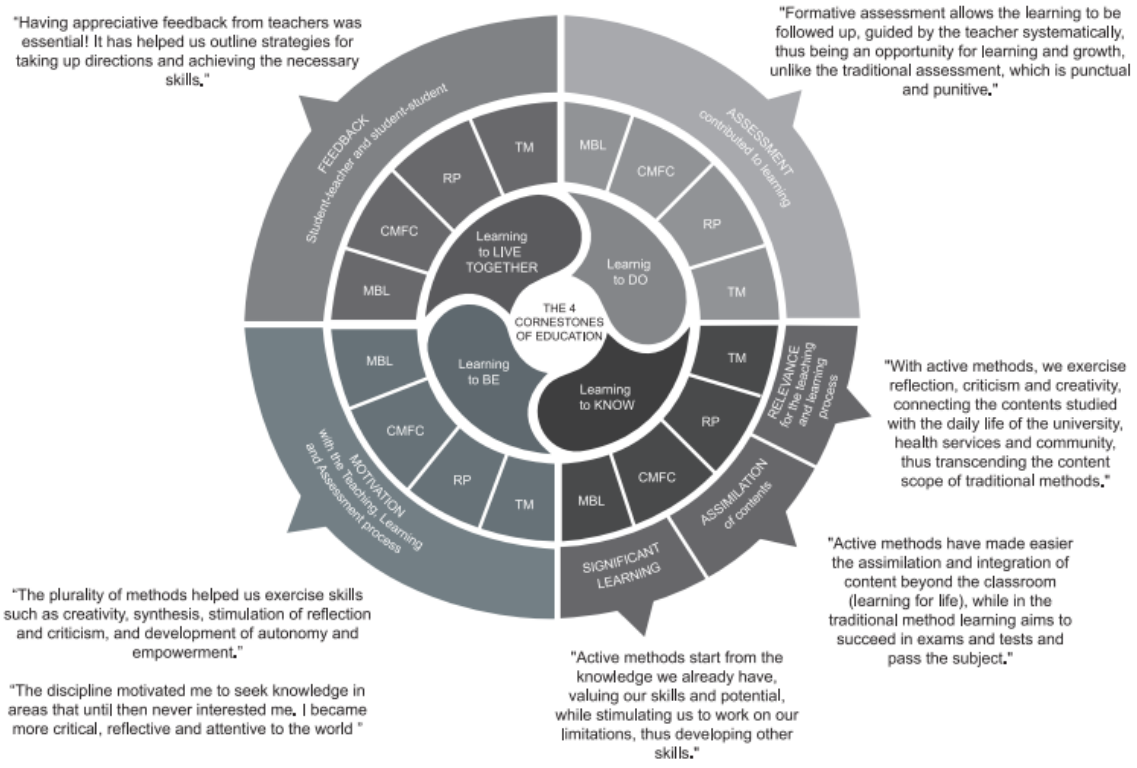
Comparison of Methods	Median	Percentile 25 – 75	p-value**
Reflective Portfolio and Concept Map	3.50 3.38	3.14 – 3.79 3.00 – 3.75	<0.001
Reflective Portfolio and Movie*	3.50 3.67	3.14 – 3.79 3.00 – 3.83	0.005
Reflective Portfolio and Traditional Classroom	3.50 2.75	3.14 – 3.79 2.38 – 3.13	<0.001
Movie* and Concept Map	3.67 3.38	3,00 – 3.83 3.00 – 3.55	<0.001
Movie* and Traditional Classroom	3.67 2.75	3.00 – 3.83 2.38 – 3.13	<0.001
Concept Map and Traditional Classroom	3.38 2.75	3.00 – 3.75 2.38 – 3.13	<0.001

*Movie-Based Learning; **Wilcoxon test

The integration of the four pillars of education (Delors 1996), according to the students' evaluation, is represented in Figure 3. Accordingly, the students reported Active Methods as

important and effective for the exercise of learning TO KNOW, learning TO BE, learning TO DO and learning TO LIVE and work TOGETHER, compared to the Traditional Classroom.

Figure 3 - Integration of the four cornerstones of education by the students' evaluations



Methods Captions

MBL: Movie-Based Learning; CMFC: Concept Map and Flipped Classroom; RP: Reflective Portfolio; TM: Traditional Method (Classroom)

Discussion

The findings of the study highlight that students evaluate Active Methods more positively when compared to traditional methods of teaching and learning. A complete educational training is characterized by the development of all knowledge, skills and attitudes. The Active Methods used (Reflective Portfolio, Concept Map with Flipped Classroom, and Movie-Based Learning), when the learning objectives are well delineated, bring positive outcomes and produce focused on student (and teacher) training processes (Cotta & Costa 2016, Roget & Serés 2014).

Our results are in agreement with other studies (Fida 2018, Davis 2009, Haffling 2010) that reported the effectiveness of Active Methods, highlighting the development of critical, reflexive, creative and argumentative capacities. There is still a lack of comparison of these

methods in a simultaneous way, even though this mixture of teaching methods is institutionalized in many graduation courses, and this study brings this as a novelty. It aims to analyze and compare, simultaneously, how students see their learning performance while using Active Methods. It is evident that the processes undertaken by the students during the course provided a meaningful learning experience, once their perception of learning academic skills and participating in collaborative work was mainly positive when Active Methods of Learning were used.

The benefits of active student-centered learning methods are not restricted to education in health sciences. In chemistry, high school students had less conceptual doubt about acids and bases when taught by Active Methods compared to teacher-centered methods (Sesen 2011), a finding which corroborates our results.

According to the students, the Reflective Portfolio was meaningful for the development of critical and reflexive skills, important for the aptitude of a professional and human being committed to the context in which they live as well as the universal, equitable and integral Health System. Scientific evidence points to the importance of Reflective Portfolio in the identification of students' weaknesses through formative assessment as well as assertive and timely feedback, enabling them to overcome their difficulties and achieve desired competence, which corroborates the experience we reported (Cotta & Costa 2016, Dolan 2018).

The Concept Map and Flipped Classroom, in turn, were essential for cognitive learning, implementing a different dynamic, interactive, systematic and holistic form of content assimilation and integration. Similarly, studies developed by Hsiu-Ting Hung (Hong 2015) found that the use of technology combined with Flipped Classes has positive effects on active learning. In the Movie-Based Learning, the students were motivated and enthusiastic, since they were able to creatively reflect on current events from the cultural and artistic perspective through the analysis of different world realities.

The drawbacks of Active Methods cited by the students were similar to those reported in the literature (O'Brien 2016, Yough 2017). The students found Reflective Portfolios to be time demanding and Flipped Class also requires time to study outside the class. In the present study, these problems were partially solved by dedicating part of the weekly hours of the course for activities.

Limitations and Implications for Future Research

The main limitation of this study was its relatively small sample size. However, we emphasize that the target population is undergraduate students (Nursing, Medicine and Nutrition) who took the course over a four-year period (2016 to 2019), demonstrating an interprofessional diversity.

Also, the summative assessment at the end of the course may have influenced students' perceptions and answers in the questionnaire, as it is well known that assessment drives learning (Wormald 2009). Thus, the type of assessment may have driven the observed differences. It would be interesting to study the combination of formative assessment methods with the Active Learning methods. We encourage the use of the Questionnaire in future studies, prioritizing a larger sample size and extension to other universities with different contexts.

Conclusion

This paper reports the development and application of a Questionnaire that serves as a possible assessment tool of students' evaluations of the effectiveness of Active and Traditional Teaching, Learning and Assessment methods. Based on its high Cronbach's alpha coefficient, the Questionnaire is considered reliable. The applied Active Methods were well accepted by the students, and they found it useful for the support of a variety of academic and scientific skills, especially those that demand critical, reflective and creative thinking skills, as well as argumentation, assimilation and integration of the contents of the course.

In particular, the use of Movie-Based Learning, followed by the Reflective Portfolio and Flipped Classroom with concept mapping gave the students the opportunity to put into practice skills prioritized by the curriculum and international guidelines of 21st-century universities.

Another important factor highlighted by the students regarding Active Methods compared to traditional methods was the development of self-assessment skills stimulated by formative assessment and timely, assertive and longitudinal feedbacks, essential for the development of strategies to get back on track and attain the learning objectives outlined for the academic semester, consolidating strong teacher-student and student-student relation.

Finally, it should be noted that the effective implementation of active learning methods, such as the Reflective Portfolio, Flipped Classroom with Conceptual Mapping, and Movie-Based Learning, strongly depends on the involvement of capable, dedicated, enthusiastic, studious, and flexible teachers (Fida 2018, Cotta & Ferreira 2019, Wormald 2009) and demand considerable time commitment from faculty and students. Teachers wishing to implement these Active Methods should seriously consider whether they are willing to undergo professional training and are capable of developing a favorable learning environment. The educational culture of the university and factors related to the social and cultural context, pedagogical project and curriculum should also be taken into consideration in order to reduce the risk of applying Active Methods in a mechanized and technical way, thus stigmatizing the innovative process and reducing it to a mere technique.

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Appendix: Brief description of the films used in Movie-Based Learning

Movie: Sicko - United States, 2007, Direction and Screenplay: Michael Moore

Michael Moore analyzes the American health care system and observes that the system cannot adequately serve millions of Americans should there be crises. In addition, the problem becomes clearer when he visits countries with free health care (Canada, France, the United Kingdom and Cuba).

Movie: John Q - United States, 2002, Director: Nick Cassavetes, Screenplay: James Kearns

The son of John Quincy is diagnosed with a type of cardiomegaly and his health insurance cannot cover treatment costs, which are limited to transplant. Unable to afford the treatment, Quincy, in a desperate attitude, takes an entire emergency room of a hospital hostage, demanding the treatment of his son and a solution to the case through discussions with two police chiefs.

Movie: (Detachment) - United States, 2011 Director: Tony Kaye, Screenplay: Carl Lund

Henry Barthes is a high school teacher who has the habit of teaching as a substitute with the premise of not having ties. He is invited to teach in a public school. He discovers an environment of unmotivated teachers, and neglected and violent students. He encourages these students to think for themselves. At the same time, he goes through a family crisis, cares for her grandfather, and undergoes significant changes after meeting a teenager at risk.

Movie: To Sir, with Love - United Kingdom, 1967, Direction and Screenplay: James Clavell

Mark Thackeray, an unemployed engineer, starts a job as a teacher of a class considered lost by the rest of the school. He faces the challenge of leading the class with "troubled" and rejected students and is met with hostility. Hackeray takes responsibility and decides to transform his students by showing them their worth.