

**ACCEPTABILITY OF ACTIVE TEACHING-LEARNING METHODOLOGIES  
AMONG DENTISTRY STUDENTS**

**ACEITABILIDADE DAS METODOLOGIAS ATIVAS DE ENSINO APRENDIZAGEM  
ENTRE DISCENTES DE ODONTOLOGIA**

**ACEPTABILIDAD DE LAS METODOLOGÍAS ACTIVAS DE ENSEÑANZA  
APRENDIZAJE ENTRE ESTUDIANTES DE ODONTOLOGÍA**

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**ABSTRACT:** The study has two complementary objectives: to present the Active Teaching-Learning Methodologies (MAEA, Portuguese initials) applied, guided by constructivist-interactionist educational processes, in a dentistry undergrad course of a federal university; and analyze the student acceptability and these methodologies. The research constitutes itself of an observational study with a transversal delimitation. MAEA has been experienced by 175 students who attended two mandatory theoretical disciplines, being 91 of the first (freshmen) and 84 of the last year (seniors). 161 students (92,4%) answered the questionnaire, evaluating the discipline content acceptability, classroom and preparatory activities, the professor's didactic, the student/professor empathy and the student commitment. A high student acceptability to the andragogic activities was identified in the evaluated domains: theoretical content (92.4%), classroom activities (82.0%) and preparatory activities (69.9%). It was concluded that there was excellent acceptability of the active methodologies by the students who participated of the research, being higher and less didactic-dependents among the senior students. It legitimized the assumptions of the innovative/active educational paradigm and its introduction since the initial years of graduation.

**KEYWORDS:** Teaching. Higher education. Human resources in dentistry. Problem-based learning. Dentistry colleges.

**RESUMO:** O estudo tem dois objetivos complementares: apresentar as Metodologias Ativas de Ensino-Aprendizagem (MAEA) aplicadas, pautadas em processos educacionais

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*construtivistas-interacionistas, em um curso de graduação em odontologia de uma universidade federal; e analisar a aceitabilidade discente a essas metodologias. A pesquisa se constitui de estudo observacional com delimitação transversal. Vivenciaram as MAEA 175 discentes que cursaram duas disciplinas teóricas obrigatórias, sendo 91 do primeiro (ingressantes) e 84 do último ano (concluintes). Responderam ao questionário 161 discentes (92,0%), avaliando aceitabilidade ao conteúdo da disciplina, as atividades presenciais e preparatórias, a didática do docente, a empatia discente/docente e o comprometimento discente. Identificou-se elevada aceitabilidade dos discentes às atividades andragógicas nos domínios avaliados: conteúdo teórico (92,4%), atividades presenciais (82,0%) e atividades preparatórias (69,9%). Conclui-se que houve excelente aceitabilidade das metodologias ativas pelos discentes estudados, sendo maior e menos didático-dependentes entre os estudantes concluintes. Legitimou os pressupostos do paradigma educacional inovador/ativo e sua introdução desde os anos iniciais da graduação.*

**PALAVRAS-CHAVE:** *Ensino. Educação superior. Recursos humanos em odontologia. Aprendizagem baseada em problemas. Faculdades de odontologia.*

**RESUMEN:** *El estudio tiene dos objetivos complementarios: presentar las Metodologías Activas de Enseñanza-Aprendizaje (MAEA) aplicadas, pautadas en procesos educacionales constructivistas-interaccionistas, en una carrera de grado en odontología de una universidad federal; y analizar la aceptabilidad discente a estas metodologías. La investigación se constituye de estudio observacional con delimitación trasversal. Vivenciaron las MAEA 175 estudiantes que cursaron dos asignaturas teóricas obligatorias, siendo 91 del primero (ingresantes) y 84 del último año (concluyentes). Contestaron al cuestionario 161 discentes (92,0%), evaluando aceptabilidad al contenido de la asignatura, las actividades presenciales y preparatorias, la didáctica del docente, la empatía discente/docente y el comprometimiento discente. Se identificó elevada aceptabilidad de los discentes a las actividades andragógicas en los dominios evaluados: contenido teórico (92,4%), actividades presenciales (82,0%) y actividades preparatorias (69,9%). Se concluye que hubo excelente aceptabilidad de las metodologías activas por los discentes estudiados, siendo mayor y menos didáctico-dependientes entre los estudiantes concluyentes. Legitimó los supuestos del paradigma educacional innovador/activo y su introducción desde los años iniciales de la graducación.*

**PALABRAS CLAVE:** *Enseñanza. Educación superior. Recursos humanos en odontología. Aprendizaje basada en problemas. Facultades de odontología.*

## Introduction

Great and rapid changes in social relations have imposed challenges for andragogic practice in Higher Education (MACHADO *et al.*, 2017) and demanded to overcome fragmentation in the organization of health care (MARIN *et al.*, 2010). In this sense, the academic is expected to develop critical-reflective, creative, affective, interaction and communication skills, which are little worked on in regular classes in the traditional model (ROMERAL, 2019; VERAS; FERREIRA, 2010; NASCIMENTO *et al.*, 2013).

In this scenario, Active Teaching-Learning Methodologies (MAEA) have assumed a prominent position, since they represent innovative strategies for the formation and qualification of health professionals, in order to instrumentalize them in technical, ethical and political aspects for the transformation of work processes in the health area (MARIN *et al.*, 2010; MACHADO *et al.*, 2017). These methodologies are configured as an alternative to the traditional teaching-learning model and are based on a problematizing pedagogy, where there is a stimulus for student autonomy, based on the construction of competences and a student-centered approach and significant learning (PAIVA *et al.*, 2016; OLIVER *et al.*, 2008). Such changes in andragogical practices are constantly changing and seek to form students motivated to “learn to learn” (MITER, 2008), forming more active, reflective and autonomous professionals in the search for new knowledge in their professional trajectory.

In the area of health, different methodologies are being adopted to integrate: theory and practice, teaching and learning, service and community. These methodologies also seek to develop the reflective capacity about social problems and support the planning of creative actions capable of modifying social reality (REUL *et al.*, 2016).

The profile of the Dental Surgeon who graduated from undergraduate courses in dentistry, with a generalist, humanistic, critical, reflective and autonomous character, to meet the social and regulatory needs, defined by the new National Curricular Guidelines (DCNs), is aligned with this movement, when recommending the adoption of these strategies so that they acquire sufficient skills considering the characteristics already defined by the previous guidelines (BRASIL, 2002; BRASIL, 2018).

Educational experiences using MAEA in Dentistry began to be reported at the Universities of Adelaide (Australia, 1993) and Harvard (USA, 1995) (GRENWOOD *et al.*, 1999; THAMMASITBOON *et al.*, 2007), advancing later to other countries such as: Canada, Ireland, Sweden, England, Thailand (RICH *et al.*, 2005). In Brazil, there is a shortage of scientific production and the experiences of using MAEA in Dentistry are punctual and more present in courses in the South and Southeast regions (MACIEL *et al.*, 2019). An important challenge identified in the national territory is the resistance of many professors in the health field to cross the traditional educational methodology to active/innovative models, alleging the lack of specific preparation for formation in this new methodology (LAZZARIN *et al.*, 2007; DEUS *et al.*, 2014; NORO, 2015).

The MAEA developed in the present study were based on constructivist-interactionist educational processes. MAEA is assumed based on constructivism by recognizing it as a theoretical conception of how man comes to knowledge, which is something unfinished and

unfolds in a different posture for its acquisition, composing a new teaching paradigm (LEAO, 1999). Despite criticisms of constructivism, this theory has been rethought and reinforced, maintaining itself as the basis for national educational guidelines (BRASIL, 2002; CHAKUR, 2015). In the sense of interactionism, the MAEA proposed in this study reinforce the interaction between the subject who learns actively and the object; the recognition of the students' previous knowledge, the performance of the most experienced (peers and teachers) and the contextualization and experience in the learning environment are valued (LIMA *et al.*, 2017).

This study starts from the need to transition from the traditional educational model (MACHADO *et al.*, 2017) to active/innovative models, indicated for the formation of the new graduate profile of undergraduate courses in the health area, especially in this study in the field of Dentistry (BRASIL, 2018). The two complementary objectives of this study were: to present the Active Teaching-Learning Methodologies (MAEA) applied, guided by constructivist-interactionist educational processes, in an undergraduate dentistry course at a federal university; and analyze student acceptability to these methodologies. The hypothesis worked out was that students in the final phase of the course (graduating students) have greater acceptability of active methodologies when compared to students in their initial phase (incoming).

## **Methodology**

### **Ethical Aspects and Research Protocol**

The present study followed ethical criteria established for research on human beings determined at the national (Resolution No. 466/2012 of the National Health Council/Brazil) and international (Helsinki Declaration). The research protocol was approved by the Research Ethics Committee of the Federal University of Santa Catarina (UFSC), under opinion number 2.651.306, CAAE: 82990718.0.0000.0121. The research protocol and the writing of the article were based on the Reporting of Observational Studies in Epidemiology (STROBE).

### **Study framework**

An observational study with cross-sectional delimitation was developed with undergraduate students in dentistry at a Brazilian federal university in southern Brazil who participated in two theoretical disciplines developed with MAEA, one in the first and the other in the fourth year of the course curriculum. The intention was not to restructure the curriculum,

but to apply and analyze the use of MAEA in two subjects, comparing the acceptability of incoming and graduating students.

### **Context of study and application of MAEA**

The study was developed at the Federal University of Santa Catarina, Dentistry course, in the years 2018 and 2019, in regular classes that had between 40 and 50 students. MAEA based on the constructivist-interactionist line of thought was used, based on the method of problematization and combined assessment (formative and summative), in the development of two mandatory theoretical disciplines of the 1<sup>st</sup> and 4<sup>th</sup> years.

### **MAEA used in the study context**

An educational proposal was developed, based on constructivist-interactionist, problematizing and affective ideas, by Piaget, Vygotsky, Foucault and Freire and their followers. The proposal considers the richness of Piaget's theorizations in their own spaces - those of Epistemology and Psychology, when investigating new forms of thought and the construction of knowledge, intending to educate men creators, inventors and discoverers (CHAKUR, 2015); the conceptions of Freire and Vygotsky assume the valorization of everyday knowledge (GEHLEN, *et al.*, 2010); from Foucault we rethink what is normative and is guided by the absence of an absolute truth and, consequently, the deconstruction of the notions of true/false, right/wrong, beautiful/ugly (FOUCAULT, 2004); from Freire we reinforce the importance of welcoming new generations and their cultural insertion, in addition to openness to dialogue, freedom, participation, sharing of knowledge and perceptions, combining affective, human, scientific, epistemological and ethical references (NASCIMENTO *et al.*, 2013).

With these bases in mind, the MAEA proposal implemented was guided by three factors: (1) the National Curriculum Guidelines (DCN) (BRASIL, 2002; BRASIL, 2018); (2) the holistic conception of competence (RAMOS, 2002; LIMA, 2005; TAVARES, 2018); and (3) the andragogical principles that establish learning with adults based on motivation, needs and respect for interests; centered on the life, experience and engagement of the teacher in mutual investigation with the students, considering the differences in style, time, place and pace of learning (KNOWLES, 1980).

The constituted method was also characterized as a problematizer, combined and hybrid (classroom and online), of an evaluative mediating character, with democratic and

emancipatory bases and guided by competence. Three methodological proposals were incorporated: Problematization (BERBEL, 1995; FOUCAULT, 2004; VINCI, 2015; LIMA, 2017); Problem-Based Learning (PBL); and Team-Based Learning (TBL) (MICHAELSEN, 2002; LIMA *et al.*, 2017).

The techniques, tools and technologies were created in a shared way with the teachers involved with the subjects included in the study. The classroom and preparatory activities (extra room) were planned based on the content defined in the curriculum of the undergraduate course in dentistry at the university and adaptations of the content and andragogical approach were promoted, to awaken the student to the active methods used. The extra-classroom activities, considered as study, reading and preparation, were provided in addition to the discipline's workload.

Were used as learning triggers: the narratives of practices, interviews, articles, book chapters, the official documents of the Ministry of Health, the laws (laws, rules and resolutions), interview programs, the short films (lasting up to 30min) and feature films (with a minimum duration of 70 minutes), construction of thematic panels, analysis of experiences, problem situations, problematization of simulated and real cases, plenary sessions, technical visits to internal sectors and social organizations and equipment external to the institution higher education.

In the logic of cooperative learning, four to five groups (learning communities) were structured, which accounted for a minimum of 5 and a maximum of 10 students, according to the number of students enrolled in the subjects. The learning communities were suggested by the mediators and organized by the students themselves, through affinities between them. Andragogical actions required frequent contacts and coexistence and teamwork, in a collaborative, autonomous, respectful and productive way. The activities, in the classroom and preparatory, were guided by consignments provided by the *Whatsapp*® application. Consignments play an important role in communicating information, clear, complete and affirmative, in order to guide the development of activities, in person or in preparation, by students. They are generally prepared by combining text and associated images that are representative of the theme and context referred to.

In the interactive online component, there was a predominance of the use of *Whatsapp*® to provide guidance, bring the contact between teacher-student and exchange messages (doubts, questions and shares). MARTINS *et al.* (2018) analyzed that the use of mobile devices in the classroom meets the profile of students of higher education in contemporary times, highlighting the need for (re) construction of andragogical practices in the face of this student body. The

moodle platform was also used in complementary communication for teacher / student interaction to provide programmatic themes, literary and digital references, articles and assessment concepts distributed during the school semester.

### **Study participants**

The study sample was intentional, including students who took a course in the first (freshmen) and fourth year (seniors) of the course, during the second semester of 2018 and the first semester of 2019. The universe of students who took these disciplines in the study period was 175, with 91 freshmen and 84 seniors.

Six teachers participated in the application of the method in the classroom. Of these, two were coordinators of the aforementioned disciplines and were part of the experiential methodological preparation, that is, formation with a 180-hour workload in MAEA, a recommended stage and prior to the application of the method, with the students. The other teachers agreed to participate in the study and to develop their tools and strategies during its development. There was the support and guidance of the researcher, specialist in MAEA, who participated, actively and in person, in the classroom, during the planning, execution and evaluation of the andragogic act, monitoring and making adjustments that were necessary.

### **Measurement of data**

Data were collected through a structured questionnaire developed by the researchers, consisting of six questions divided into two groups with Likert-type answers. In the first group of questions, the students evaluated the contribution of the discipline to professional formation considering the theoretical content domains, the andragogic activities developed in the classroom and the activities and tasks developed outside the classroom (preparatory). In the second group of questions, the students evaluated the teaching performance related to the didactics with the MAEA, the relationship with the students (empathy), and the student commitment that consisted of self-assessment, regarding the student participation in the classroom and preparatory activities.

### **Data analysis**

The data were tabulated and analyzed using the IBM SPSS Statistics® Software version 21. The answers to the first group of questions were dichotomized into positive evaluation

(“strongly agree” and “partially agree”) and negative evaluation (“strongly disagree” and “partially disagree”). The answers to the second group of questions were dichotomized into high performance (“good” and “very good”) and low performance (“regular” and “insufficient”). The answers “I don't know how to give an opinion” were discarded in both groups of questions, as they did not indicate any of the two poles of answers considered.

Initially, data exploration and descriptive analysis were carried out. Then, the association between the responses obtained from the students, for all the variables collected, and the stage of the course (incoming and concluding) was tested using the Chi-square test. Then, the association between domains theoretical knowledge, andragogic activities and preparatory activities with the didactics of the teacher, with the relationship with students and student commitment (self-evaluation of participation and involvement in the discipline) was tested, considering the two stages of the course, through the Chi-square test or Fischer's Exact Test, when necessary. In all bivariate analyzes, a significance value of less than 5% ( $p < 0.05$ ) was considered.

## Results

Of the 175 students regularly enrolled and who experienced MAEA in two mandatory subjects of the dentistry course, 161 students answered the questionnaire, which corresponded to a research participation rate of 92.00%. In 2018, 32 freshmen (19.90%) and 30 seniors (18.60%) participated. In 2019, 45 freshmen (33.50%) and 54 seniors (28.00%) participated. The positive evaluation prevailed in all domains evaluated: theoretical content ( $n=145$ ; 92.4%), classroom activities ( $n=123$ ; 82%) and preparatory activities ( $n=102$ ; 69.9%). There was also a high level of student commitment ( $n = 132$ ; 82.0%). The descriptive data of the analyzed variables are shown in Table 1.



**Table 1** - Distribution of students according to the variables analyzed

	Dentistry Course Students	
	N	%
<b>Evaluated year (N= 161)</b>		
2018	62	38,5
2019	99	61,5
<b>Course taken (N=161)</b>		
Seniors	77	47,8
Freshmen	84	52,2
<b>The theoretical content contributed to my formation (N=157)</b>		
Negative evaluation	12	7,6
Positive evaluation	145	92,4
<b>Classroom activities (theoretical classes) contributed to my formation (N= 150)</b>		
Negative evaluation	27	18,0
Positive evaluation	123	82,0
<b>Preparatory activities (extra class) contributed to my formation (N= 146)</b>		
Negative evaluation	44	30,1
Positive evaluation	102	69,9
<b>Teacher didactic evaluation (N= 161)</b>		
Low performance	36	22,4
High performance	125	77,6
<b>Evaluation of the teaching relationship with the student (empathy) (N=161)</b>		
Low performance	15	9,3
High performance	146	90,7
<b>Self-evaluation of participation and involvement in the discipline (N=153)</b>		
Non-commitment	21	12,9
Commitment	132	82,0

N= Number of respondent students; %= percentage.

Source: Devised by the authors

Table 2 shows the responses obtained in the segmentation of students regarding the stage of the undergraduate course. The concluding students showed greater acceptability in the dimensions of classroom classes ( $p = 0.021$ ), preparatory activities ( $p = 0.001$ ), teaching didactics ( $p < 0.001$ ) and the relationship between student and teacher (0.008).

**Table 2** - Analysis of the association of the variables under study with the stage / discipline of the course in which the students are inserted

	Freshmen		Seniors		X <sup>2</sup>	P value	Greater acceptability
	N	%	N	%			
<b>The theoretical content contributed to my formation</b>							
Negative evaluation	9	14,3	3	5,2	1,92	0,165	There was no association
Positive evaluation	72	85,7	73	94,8			
<b>Classroom activities contributed to my formation</b>							
Negative evaluation	19	32,5	8	12,3	5,29	0,021	Seniors
Positive evaluation	56	67,5	66	87,7			
<b>The preparatory activities contributed to my formation</b>							
Negative evaluation	33	50,0	11	22,1	10,4	0,001	Seniors
Positive evaluation	52	50,0	60	77,9			
<b>Teacher didactic evaluation</b>							
Low performance	29	35,7	6	7,8	17,2	<0,001	Seniors
High performance	54	64,3	71	92,2			
<b>Evaluation of the relationship between the teacher and the students</b>							
Low performance	14	16,7	1	1,3	11,2	0,008	Seniors
High performance	60	83,3	76	98,7			
<b>Self-evaluation of participation and involvement in the discipline</b>							
Low performance	13	23,8	8	11,2	0,65	0,416	There was no association
High performance	67	76,2	68	88,3			

N= Number of students; %= percentage; X<sup>2</sup> = Chi-square test; p<0,05

Source: Devised by the authors

Table 3 shows the association between the performance of the didactics of the teacher assessed with the two groups of students (freshmen and seniors) and the perception of the contribution to the formation (theoretical content, classroom classes and preparatory activities). Statistically significant associations were measured only for the measurements of the freshmen, which indicate that the lower the measurement of the teacher didactic by the students, the less the assimilation of the theoretical content (X<sup>2</sup> = 6.89), the lower the acceptability of classroom activities (X<sup>2</sup> = 9.43) and lower the acceptability of preparatory activities (X<sup>2</sup> = 15.48).

**Table 3** - Analysis of the association between teaching didactics and student perceptions about the contribution to their formation, in the face of the MAEA aspects (theoretical content; Classroom Activities; and Preparatory Activities) and the stage of the undergraduate course

	Teacher's performance regarding didactics					
	Freshmen			Seniors		
	Low N (%)	High N (%)	P value	Low N (%)	High N (%)	P value
<b>The theoretical content contributed to my formation</b>						
Negative evaluation	7(11,1)	2(3,2)	0,008	1(1,3)	2(2,6)	0,565
Positive evaluation	2(3,2)	52(82,5)		5(6,6)	68(89,5)	
<b>Classroom activities contributed to my formation</b>						
Negative evaluation	12(15,8)	7(9,2)	0,002	2(2,7)	6(8,1)	0,152
Positive evaluation	14(18,4)	43(56,6)		3(4,1)	63(85,1)	
<b>The preparatory activities contributed to my formation</b>						
Negative evaluation	20(26,7)	13(17,3)	0,001	1(1,4)	10(14,1)	0,724
Positive evaluation	7(9,3)	35(46,7)		4(5,6)	56(78,9)	

N= Number of students; %= percentage; (a) Chi-square test; (b) Fisher's exact test;  $p < 0,05$

Source: Devised by the authors

Table 4 shows the association between the performance of the teacher and student relationship measured with the two groups of students (freshmen and seniors) and the perception of the contribution to formation (theoretical content, classroom classes and preparatory activities). Statistical tests showed that there was no statistical association between the student-teacher relationship and the perception of the contribution of MAEA to student formation in any of the domains evaluated, whether at the beginning or at the end of the course.

**Table 4** - Analysis of the association between the relationship with the teacher (empathy), the perception of the contribution to formation and the stage of the undergraduate course

	Performance of the relationship between teacher and student					
	Freshmen			Seniors		
	Low N (%)	High N (%)	P value	Low N (%)	High N (%)	P value
<b>The theoretical content contributed to my formation</b>						
Negative evaluation	1(1,2)	8(9,9)	0,666(a)	0(0,0)	1(1,4)	1,000(b)
Positive evaluation	12(14,8)	60(74,1)		1(1,4)	72(97,2)	
<b>Classroom activities contributed to my formation</b>						
Negative evaluation	5(5,6)	14(18,4)	0,379(a)	0(0,0)	8(10,8)	1,000(b)
Positive evaluation	8(10,5)	49(64,5)		1(1,4)	65(87,8)	
<b>The preparatory activities contributed to my formation</b>						
Negative evaluation	8(10,7)	25(33,3)	0,090(a)	0(0,0)	11(15,5)	1,000(b)
Positive evaluation	4(5,3)	38(50,7)		0(0,0)	60(84,5)	

N= Number of students; %= percentage; (a) Chi-square test; (b) Fisher's exact test;  $p < 0,05$

Source: Devised by the authors

## Discussion

When applying and analyzing the use of MAEA, verifying the acceptability of freshmen and senior students, in view of the disciplines developed in the undergraduate course in Dentistry at a federal university in southern Brazil, this study identified a high acceptance of the proposed methodology in all domains evaluated (theoretical content, classroom activities and preparatory activities). It was possible to confirm the hypothesis that students with greater academic maturity (seniors) have greater acceptance for the use of active methodologies.

When analyzing the influence of the teacher in the application of active teaching-learning methodologies, it was possible to understand that the lower measurement of the didactics of the teacher by the student influenced the acceptability of MAEA by the freshmen. The relationship between teacher and student did not show a statistically significant interference for any of the groups of students investigated.

Although there are studies that demonstrate a preference of undergraduate students for traditional methods centered on the teacher (DEUS *et al.*, 2014), the acceptability of MAEA has been identified in some experiences in undergraduate courses in Dentistry in Brazil, demystifying the idea of difficulty in accepting students (PIRES; BUENO, 2006; CARVALHO *et al.*, 2016; GONÇALVES, *et al.*, 2018; SARAIVA *et al.*, 2018; REUL *et al.*, 2016; SILVA

*et al.*, 2020). It is worth mentioning that these experiences largely used the problematization methodology (PIRES; BUENO, 2006; CARVALHO *et al.*, 2016; SARAIVA *et al.*, 2018; REUL *et al.*, 2016; SILVA *et al.*, 2020). The acceptability of MAEA compared to traditional methods is also observed in international studies, usually PBL (BAEPLER; WALKER; DRIESSEN, 2014; O'FLAHERTY; PHILLIPS, 2015; GILBOY; HEINERICHS; PAZZAGLIA, 2015; HUNG, 2015). Both problematization and PBL are modalities that help to overcome the traditional model of teaching in favor of a form of teaching-learning that considers the complexity with which reality presents itself (MARIN *et al.*, 2010).

Authors who defend the use of MAEA in undergraduate courses in Dentistry have identified several advantages of this methodology in the results of their studies (SARAIVA *et al.*, 2018; REUL *et al.*, 2016; SILVA *et al.*, 2020). Saraiva *et al.* (2018) and Silva *et al.* (2020) pointed out that MAEAs favor teamwork, since they encourage collaborative interprofessional practices. Reul *et al.* (2016) realized that MAEAs arouse interest in students to think, question, learn to learn and assume their role as a future transformer of social reality. For Silva *et al.* (2020), MAEA stimulated the protagonism, creativity and autonomy of students involving cognitive, communicational, aesthetic and social dimensions. Freitas *et al.* (2009), Mesquita (2016) and Silva *et al.* (2020) affirm that these methodologies play an important role in making students assume the commitment to intervene on social needs.

Some elements are pointed out to guarantee a greater acceptability of MAEA: the previous formation of teachers to use the new methodologies (DEUS *et al.*, 2014; GUIMARÃES *et al.*, 2016), the guarantee of a minimum time of three years to consolidate the pedagogical practices proposed (DEUS *et al.*, 2014), the direction of the MAEA for internships in the health network (CARVALHO *et al.*, 2016; REUL *et al.*, 2016), a constant review and critical reflection on the processes used (MARIN *et al.*, 2010) and trigger new teaching 'transforms-actions', through new lenses of interpretation regarding challenges and possible paths (COSTA; VIEIRA, 2018).

Among these aspects, the results of this study highlighted the importance of the didactics of the teacher in the acceptability of MAEA. It is also noteworthy the fact that the teachers responsible for the disciplines took the preparatory course on MAEA before adopting the method in the classroom, as well as the continuing education developed during the course of the study (weekly contact and critical evaluation meetings) reflective with the researcher in charge).

Several factors may be related to the teacher's ability to apply the active methodologies. Such factors include teacher resistance and difficulty in understanding the applicability of

MAEA (MESQUISTA, 2016; ROMERAL, 2019); the academic and professional experiences of teachers, since younger teachers are more receptive and motivated to change (NAGIB, 2018; OLIVEIRA *et al.*, 2018); the lack of effective investments in teacher formation and development (NAGIB, 2018; ALVES; MACHADO, 2018); and the demand for greater effort and dedication to plan classes and activities (GUIMARÃES *et al.*, 2016). It is important to note that, in addition to the proper formation of teachers, a curricular restructuring has been identified as a fundamental element for the development of MAEA in undergraduate courses (MESQUITA, 2016; ALVES; MACHADO, 2018).

The results of this study showed that the group of freshmen was more didactic-dependent than the group of seniors, the latter being less dependent on this aspect. The lower dependence on didactics by seniors may be related to the fact that in the last year of the undergraduate courses there is a greater concentration of internships and proximity to professional life (IGUE; BARIANI; MILANESI, 2008); in addition to being a time when the student presents greater academic maturity, when it brings together a series of competencies and skills for learning (MANABE *et al.*, 2014). As for the group of freshmen, it is observed that they are fresh out of high school (usually from a traditional learning model), their study habits differ in different aspects from those necessary for a better adaptation in the university context (IGUE; BARIANI; MILANESI, 2008; MANABE *et al.*, 2014).

Other elements help to understand this result: the initial expectations of the most realistic students about their curricular involvement indicated better academic performance (GOMES; SOARES, 2013; POLYDORO, 2000); previous academic experiences, including with these methods (NAGIB, 2018); student performance in participation and dedication to academic activities (GOMES; SOARES, 2013); apprehension of knowledge search tools and student interest in learning (COSTA; ARAÚJO; ALMEIDA, 2016; IGUE; BARIANI; MILANESI, 2008); development of cognitive abilities that promote integrated reasoning (ROCHA *et al.*, 2016).

Despite the greatest challenge with new students, MAEA must be introduced since the beginning of graduation, aiming to establish an autonomous model of student learning (RONDON; MACIEL, 2018), enabling the paradigmatic transition from traditional to active approach (TORRES; SAMPAIO; CALDEIRA, 2019) and align with a moment of changes in the student's personal life (SOUZA; LOURENÇO; SANTOS, 2016). Enriching learning experiences have been reported with the introduction of MAEA in the first year of graduation, both for academics and teachers, supported by the in-depth thematic debate on controversial

issues and sharing of perceptions, hardly achieved in the usual traditional methodology class (RODRIGUES ; CALDAS, 2018; CARVALHO, 2018).

On the part of the teacher, the use of MAEA with the freshmen will require greater effort, as they present different strategies to deal with the difficulties of insertion in the academic life, as well as the different perception of the students about the situations experienced (SOUZA; LOURENCO; SANTOS, 2016). In addition, regardless of when the MAEAs are inserted, teachers must recognize that greater psychoandragogical support, a more significant presence, security in innovating and a loving and dedicated profile in conducting the student's educational journey during the first six months will be necessary (LIMA, 2013). Whatever the method adopted, the teacher is a guide, model, reference figure and mirror, which will reflect on various dimensions of the future student (SILVA, *et al.*, 2007; SILVA *et al.*, 2016).

Although the greater or lesser empathy between students and teachers has not changed the perception of the former about their performance, whether in the freshmen or in the seniors, it is worth noting that the application of MAEA requires a different posture on the part of those involved. The new attitude of the teacher stems from the responsibility that this actor has on the formation of people capable of evolving, reflecting and learning from experiences (DOHMS *et al.*, 2012; PERRENOUD, 2002), and the need to create a democratic space for student development (SILVA *et al.*, 2016). The teacher must assume a supportive posture, ensuring safety and loving care for innovation and conducting the student on the educational journey (LIMA, 2013; SILVA *et al.*, 2007; SILVA *et al.*, 2016).

In turn, the new stance of the student stems from the introduction into a new culture of learning, in which there must be an interest in learning in a useful way for life (POZO, 2002; SILVA *et al.*, 2016). The student needs to know how to think in order to intervene in reality, in an inclusive and democratic way, and to exercise mutual respect and dialogue, so that there is no room for impositions or limitations in his constitution as an autonomous, critical and ethical citizen, made possible by the proper management of education in its formal and political aspects (CRUZ; PEREIRA, 2013; PIZZI, 2014).

In this new relational culture, an affective posture is required (RAMOS, 2011; NASCIMENTO *et al.*, 2013; VERAS; FERREIRA, 2010), which opposes the traditional segmentation of the affective and cognitive dimensions, with greater appreciation of the latter (VERAS; FERREIRA, 2010; NASCIMENTO *et al.*, 2013). This affective stance requires that complicity and reciprocity are created, with decision making based on the non-verbal stance of the student and the encouragement of study, dialogue, reflection, recognizing and acting against violence (now subtle, now more evident), show paths of dialogue, symmetrical positions and,

mainly, interactively invest in the referred relationships between teachers and students (LEITE, 2004; SILVA, *et al.*, 2016; CRUZ; PEREIRA, 2013; AQUINO, 1998; CHAUI, 2001).

The understanding of the aspect of reciprocity among the adopted profiles is highlighted: the profile of an authoritarian teacher is associated with a dependent student; to the investigative teacher, an interested student; to the mediating teacher, an engaged student; and, finally, to an advisor professor, an autonomous student (TOMAZINHO, 2018).

The results of this study are not without limitations. First, it should be noted that, being a cross-sectional study, in which confounding variables were not collected, it is not possible to establish a clear causal relation. This limitation does not prevent the results from serving to support the planning, inclusion and improvement of MAEA in undergraduate courses. Another limitation of the study is the selection of participants. Despite seeking to include all students who have experienced MAEA in the course in question and have a high response rate, the inclusion of students was intentional and not probabilistic.

This study analyzes the experience with MAEA applied in isolation in two disciplines of an undergraduate course in Dentistry, motivated by teachers' research interests and not of institutional curriculum reform. The application of pedagogical innovations in the field of Dentistry is still incipient (MACIEL *et al.*, 2019). Difficulties such as the lack of funding for research on this theme and the lack of support and encouragement for the adoption of MAEA by the formative institution, especially in the public sphere, make transformations in education unfeasible (MACIEL *et al.*, 2019; DEUS *et al.*, 2014 ), forcing the teacher to adapt these methodologies to the resources available in his work reality, hegemonic in the traditional method (MACIEL *et al.*, 2019; LAZZARIN *et al.*, 2007; NORO, 2015). Despite this low valuation of a new andragogical practice, there is an urgent need to implement active learning, centered on the student and real problems, to form professionals suited to the health needs of the population and the Unified Health System (SUS), (FREITAS *et al.*, 2009). In Brazil, changes in education are possible, but require a long period of immersion in active learning practices (PASSOS; VIEIRA; COSTA, 2018).

## Conclusion

This study showed high acceptability of MAEA, being greater and less didactic-dependent among students who completed the undergraduate course in Dentistry at the institution studied. As implications for practice, this study points out three important aspects.



Need for greater methodological preparation of teachers, both for the application of MAEA and mastery of content, as well as attitudinal aspects (motivation, security and affectivity).

Students in more advanced stages of the course participate more actively, optimizing learning resources and providing greater integration among academics.

The possibility of introducing MAEA in the initial stages of graduation, in regular classes of 40 to 50 students, with greater attention to the didactic dependence of incoming students, demanding more from teachers to accept the application of MAEA.

Two essential factors are highlighted for the consolidation of the MAEA: teacher preparation and student involvement. These two factors are considered imperative for changes based on the understanding of the adoption of an innovative andragogic line of thought, to the detriment of a set of tools applied in isolation, in addition to the need for time and contemporary strategies, adjustments and improvements, as opposed to the model sovereign traditional.

Studies with other methodological designs, especially field and longitudinal tests, containing more significant samples, must be carried out to complement the information and increase the level of evidence of the study. Further research is also needed to verify the performance of teachers and students in the MAEA.

The excellent student acceptability to MAEA observed in this study legitimizes the assumptions of the innovative educational paradigm: problematizing education; the development of critical, reflective, autonomous and transforming skills of the student; and its constructivist-interactionist, collaborative, interdisciplinary, contextualized, investigative, motivating and humanistic components. These founding elements of the MAEA are in line with the new National Curricular Guidelines in health, bringing together elements that reveal a student formation that has experienced significant learning, dynamics of professionals committed to the world of work and the needs of the population and the resulting transformation of social reality.

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