Implementation of Alternative Teaching Methods by Teachers: The Role of Practical Experience and the Importance of Teacher Training

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September, 2019

Abstract

Previous studies have demonstrated the pedagogical advantages of alternative teaching methods (ATMs) such as project-based learning, exploratory learning, collaborative learning, and technology-integrated teaching. However, their actual implementation rate is low. The research question is which factors most influence teachers to apply ATMs. A quantitative study was conducted based on completed questionnaires from 98 teachers in Arab schools in Israel. The results show that practical experience with ATMs is the factor that most strongly correlated with their implementation. These findings are different from previous studies, which emphasized the teachers' attitudes toward ATMs and underestimated the importance of the practical experience.

Key words: alternative teaching methods, teacher training, practical experience, frontal teaching.

Introduction

For several decades, the importance of alternative teaching methods (Edelson, Gordin, & Pea, 1999; Johnson & Johnson, 1999; Thomas, 2000) and their many advantages in the teaching and learning processes (Gillies, 2016; Kokotsaki, Menzies, & Wiggins, 2016; Lazonder & Harmsen, 2016) have long been known. Accordingly, Education Ministries around the world, as well as in Israel, recommend the use of alternative teaching methods such as project based learning, exploratory learning, collaborative learning, and the integration of technologies into teaching

(Fisher, 2015; Chu, Reynolds, Tavares, Notari, & Lee, 2017; Clark, Dyson, & Millward, 2018).

Despite the increasing awareness of the importance of implementing alternative teaching methods in school, the official encouragement of Education Ministries around the world and in Israel, and the repeated attempts to increase implementation of alternative teaching methods in schools, in practice, the usage rate of alternative teaching methods remains low in Israel and throughout the world (Ratner, Rosiner, Paldi, and Freeman, 2016; Han, Yalvac, Capraro, & Capraro, 2015; Laursen, Hassi, & Hough, 2016). The purpose of this study is to help understand the causes of the low usage rate of alternative teaching methods in order to find out why the actual usage rate remains low despite the high awareness of the advantages of alternative teaching methods, and despite the many attempts to apply them in schools. For this purpose, the study focuses on the teachers' attitudes toward alternative teaching methods, the teachers' attitudes toward frontal (traditional) teaching, and the extent of experience with alternative teaching methods during the teacher training.

The study uses quantitative means and seeks to identify the factors that influence the extent to which alternative teaching methods are applied by teachers, as well as the hierarchy of importance among these factors, i.e. which of the factors more significantly influence the implementation of alternative teaching methods. This question is of great importance because identifying the factors that have greater influence on implementation of alternative teaching methods by teachers can greatly assist in increasing the usage rate of alternative teaching methods by teachers.

Literature Review

Alternative Teaching Methods

Alternative teaching methods are a general term for many teaching methods that are intended to replace the traditional frontal teaching method in which a teacher stands at the front of a classroom and transmits material (Nurutdinova, Perchatkina, Zinatullina, Zubkova, & Galeeva, 2016). The main alternative teaching methods that are repeatedly described in many studies, particularly in the context of adapting teaching methods to the 21st century, are project-based learning, exploratory learning, collaborative learning, and integration of technologies in teaching (The Pedagogical Administration, 2015; Barron & Darling-Hammond, 2008; Sithole, Kibirige, Mupinga, & Chiyaka, 2016).

Project Based Learning

Project based learning is a model that organizes the learning around a project. The projects are complex tasks that are based on a challenging question or problem. The students take part in designing the project, solving the problems, making decisions, and the exploratory actions that are required to solve the problem or answer the question. The structure of learning around a project enables the students to work relatively autonomously and present a realistic product or presentation (Thomas, 2000). Project based learning is unique in that the learning context provides authentic questions or problems and real-world learning, exploration, and problem solving practices, as opposed to "school" practices (Al-Balushi & Al-Aamri, 2014; Kokotsaki et al., 2016). As a result of these characteristics, project based learning contributes to a more significant learning experience for the students. Project based learning is based on the pedagogical assumption that students need an opportunity to configure knowledge by solving real problems, by asking questions, designing and conducting research, gathering information, processing the information gathered, interpreting

data, drawing conclusions and reporting results (Kokotsaki et al., 2016). Satisfying these needs of students enables them to establish their learning by internal motivation, thus, to better understand the material being taught and derive greater pleasure from learning (Bell, 2010). However, project-based learning requires the teachers to exert a greater effort compared with traditional frontal teaching and therefore successful application of project-based learning usually occurs only when the teachers receive sufficient support from the system to integrate project-based learning (Kokotsaki et al., 2016; Thomas, 2000).

Exploratory Learning

Exploratory learning is a learner-focused pedagogy in which the student is responsible for his or her own learning process. The theoretical basis of exploratory learning is in the constructivist approach that focuses on the experiential processes that allow students to participate in both the acquisition and construction of knowledge, thus creating deeper learning compared to the traditional teaching practices. The learning material in exploratory learning is organized around questions and problems that are relevant to the subject being taught, and requires the students to conduct the investigation and the learning, while the teachers guide the students in their investigation and support them throughout the process (Aparicio-Ting, Slater, & Kurz, 2019).

Similar to project-based learning, exploratory learning improves a student's self-confidence as an independent learner, enhances the student's involvement in the material being taught, and in turn contributes to establishing the learning out of inner motivation, leading to deeper and more significant learning. In addition, exploratory learning contributes to developing students' independent learning skills, thus preparing them for lifelong learning (Buchanan, Harlan, Bruce, & Edwards, 2016). Despite the benefits of exploratory learning, its implementation is relatively rare in

classrooms, mainly due to teachers' difficulties in applying it due to lack of sufficient training (Silm, Tiitsaar, Pedaste, Zacharia & Papaevripidou, 2017).

Collaborative Learning

Collaborative learning is not a new idea in education, but is now gaining renewed interest among educators and theorists. The term collaborative learning refers to teaching techniques in which students perform the learning activities in small groups and whose learning assessment is based on group performance rather than on individual performance (Slavin, 1980). Collaborative learning has been empirically found to contribute to students' academic achievements, development of their social skills, and improvement of their motivation to learn (Gillies, 2016). The pedagogical explanation for this is that within the group each student can find the role and way of learning that is most appropriate for him (Johnson & Johnson, 1999). In addition, inter-group competitiveness was found to be more effective in encouraging motivation compared to inter-individual competitiveness (Slavin, 1989). Also, the experience of working in a group contributes to improving students' social skills and collaboration skills (Gillies, 2016), and this is one of the reasons why collaborative learning is considered to be one of the most important tools in acquiring the skills required for the 21st century (Laal, Laal, & Kermanshahi, 2012). Despite the many advantages of collaborative learning, it is not widely applied in schools. One of the reasons is that many teachers perceive that collaborative learning is not more effective than traditional teaching (Saborit, Fernandez-Rio, Estrada, Mendez-Gimenez, & Alonso, 2016).

Technology Integrated Teaching

Integrating technologies into teaching methods can be purely technical. Such integration does not constitute an alternative teaching method as it does not replace the traditional frontal teaching method, but at most supports it (Goldstein et al., 2012). Furthermore, when technologies are incorporated correctly, the quality of learning and the students' learning experience can be improved. Learning through technological means is more similar to learning in the real life environment, and therefore is essential for lifelong learning. In addition, incorporating technology into teaching contributes to enhancing the students' digital literacy and is therefore appropriate for developing the skills needed in the 21st century (Fu, 2013). Students now use computers and technological means in everyday life outside of school. Therefore, making use of these means also for learning purposes is perceived by the students to be more natural and more enjoyable which improves their motivation to learn (Charsky & Ressler, 2011). Similar to the previously presented alternative teaching methods, technology integrated teaching is also rarely applied in classrooms. The reason for the low rate of use of ICT by teachers is mainly attributed to teachers' negative attitudes towards technology and towards the use of technology in teaching (Kumar & Rani, 2016; Tondeur, Van Braak, Ertmer & Ottenbreit-Leftwich, 2017).

The review of the main alternative teaching methods reveals that, although there is widespread consensus regarding their pedagogical advantage, the actual levels of acceptance and application in classrooms are low. The next section of the literature review will present the explanations offered by this study for the low implementation level of alternative teaching methods, despite their pedagogical benefits.

Previous studies on the implementation of alternative teaching methods

In light of the prominent gap between the consensus regarding the advantages of alternative teaching methods and their infrequent implementation, many studies have

attempted to explore the factors causing teachers to refrain from implementing alternative teaching methods in their teaching (Kashti et al., 2001; Han et al., 2015; Laursen et al., 2016; Saborit et al., 2016). One research trend that addressed this topic focused on teachers' attitudes toward alternative teaching methods. According to this approach, teachers are either unaware of the principles or advantages of alternative teaching methods, or do not perceive them as better than traditional teaching methods. The conclusion that emerged from this research trend is that the teacher training programs should be adjusted in a way that will allow teachers to develop more awareness of the alternative teaching methods, and give teachers more positive attitudes toward alternative teaching methods (Kashti et al., 2001; Kumar & Rani, 2016; Saborit et al., 2016; Silm et al., 2017).

Indeed, in accordance with these recommendations, greater emphasis on alternative teaching methods is placed in teacher training programs as well as in advanced study programs. Following this change, teachers are now more aware of the alternative teaching methods and as a result they have more positive attitudes toward them (Beck, 2013; Saborit et al., 2016). However, recent research shows that the actual implementation rates of alternative teaching methods are still low (Ratner et al., 2016; Han et al., 2015; Laursen et al., 2016). Hence, the low acceptance of alternative teaching methods cannot be explained by the teachers' attitudes alone, and additional explanations have been offered, including the greater effort required by the teacher to implement the alternative teaching methods, relative to the effort required in traditional frontal teaching (Kashti et al., 2001) as well as the lack of sufficient support by the system (Thomas, 2000).

According to Ratner et al. (2016), implementation of the National Program for Significant Learning has succeeded to significantly improve the level of systemic support provided to teachers for the implementation of alternative teaching methods. But despite this success, the study reports that the actual extent of the alternative

teaching methods remains low. These findings suggest that systemic support, despite being an important factor, cannot in itself explain the low implementation rates of alternative teaching methods by teachers. The study herein, like the previous research trend, seeks to suggest that the most significant factor influencing the implementation of alternative teaching methods is related to the teacher training programs. Unlike previous studies, this study suggests that the influence of the teacher training is not caused by modifying teachers' attitudes toward alternative teaching methods, but by having the practical experience of teaching with these methods. Therefore, the next section of the literature review will address the importance of practical experience during the professional training in general, and the professional development of teachers in particular.

The importance of practical experience

The importance of practical experience during vocational training in general (not only in the context of teacher training) has long been known. Beginning with apprenticeship in ancient times to the present day, many professions include practical experience in the training of new practitioners, including teaching staff, medical and therapeutic professionals, social workers, lawyers, professional workers in various fields, and more (Permaul, 2009). Two main theories explain the importance of practical experience in vocational training: The Active Learning Theory and The Social Learning Theory (Permaul, 2009; Schucan-Bird, Newman, Hargreaves, & Sawtell, 2015).

The Active Learning Theory focuses on the experiential aspect of practical experience and holds that learning occurs while doing, doing while being guided and instructed by a more experienced professional (Permaul, 2009), which, in the case of teachers, is the coaching teacher (Nasser-Abu Alhija, Fresco, and Reichenberg, 2011). According to the Active Learning Theory, the practical experience is a

necessary part of learning, complementary to the theoretical learning of the profession (Permaul, 2009).

The Social Learning Theory focuses on the social aspect of learning, and emphasizes the importance of the trainee's (in this case a future teacher) socializing into the profession. According to this theory, during the practical experience in the workplace, the trainee has a richer learning experiences and pays more attention to learning. In addition, social learning enables the transfer of more types of knowledge as compared to theoretical learning alone, and the feedback received from the instructor and the environment is of great importance. This theory, as well, emphasizes the importance of practical experience as part of professional training in general (Schucan-Bird et al., 2015) and teacher training in particular (Schauer, 2018).

Both theories have in common the emphasis on the importance of practical experience during the professional training of professional workers in general and of teachers in particular (Permaul, 2009; Schucan-Bird et al., 2015). However, it seems that teachers' exposure to alternative teaching methods remains theoretical only. As stated by Beck (2013), teacher-training programs today expose teachers to alternative teaching methods and give more emphasis to innovative pedagogical approaches and practices. With that being said, during the practical experience, the teachers are exposed primarily to the teaching practices of the coaching teacher, who typically is more experienced and uses traditional teaching methods (Goldenberg, Schatz-Oppenheimer, Schwabsky, and Basis, 2012). Thus, a gap is created between the theoretical learning and the practical learning. The teachers are exposed to alternative teaching methods during their theoretical training, but their practical experience includes only, or primarily, frontal-traditional teaching. This gap may be the main barrier of implementation of alternative teaching methods by teachers in practice.

Study Question and Hypothesis

The purpose of this study is to understand why, despite the high awareness of the advantages of alternative teaching methods, and despite the many attempts to implement them in schools, their actual usage rates remain low. The study question derived from this goal is - what are the factors that influence the implementation of alternative teaching methods by teachers.

According to Beck (2013), changes have been made in teacher training programs in recent decades that have increased teachers' exposure to alternative teaching methods. This exposure is expected to lead to more positive attitudes among teachers towards alternative teaching methods, thus encouraging their implementation (Saborit et al., 2016). Therefore, the first study hypothesis is that newer teachers, who have been trained in recent years, will implemented more alternative teaching methods than experienced teachers who have been less exposed to alternative teaching methods throughout their training:

1. An inverse relationship will be found between years of experience in teaching and the rate of implementation of alternative teaching methods.

Previous studies have indicated the relation between teachers' attitudes toward alternative teaching methods and their actual implementation. According to these studies, teachers' more positive attitudes toward alternative teaching methods will lead to their wider application in classrooms (Han et al., 2015; Laursen et al., 2016; Saborit et al., 2016). Therefor the second study hypothesis is:

2. A direct relationship will be found between the attitudes towards alternative teaching methods and the rate of implementation of alternative teaching methods.

The attitudes toward frontal (traditional) teaching is a variable previously unexplored in itself. Some of the studies that examined attitudes toward alternative teaching methods referred to the attitudes toward alternative teaching methods compared to the attitude toward traditional teaching (Kashti et al., 2001; Saborit et al., 2016). Hence, although attitudes toward frontal teaching have not been examined in the past as an independent variable, based on these studies, it is hypothesized that more positive attitudes toward frontal teaching will result in lower implementation of alternative teaching methods. Therefore, the third study hypothesis is:

3. An inverse relationship will be found between positive attitudes towards frontal teaching and the rate of implementation of alternative teaching methods.

According to the Social Learning Theory and the Active Learning Theory, the practical experience throughout the professional training is of very high importance (Permaul, 2009; Schucan-Bird et al., 2015). Therefore, practical experience with alternative teaching methods during the teachers' training is expected to lead to wider implementation of alternative teaching methods by teachers. Accordingly, the fourth hypothesis is:

4. a. A direct relationship will be found between practical experience with alternative teaching methods during the professional training and the rate of implementation of alternative teaching methods.

   b. A direct relationship will be found between practical experience with alternative teaching methods during advanced professional training and the rate of implementation of alternative teaching methods.

According to the Social Learning Theory and the Active Learning Theory, the role of the practical experience is key in the teachers' training, and without practical experience teachers are unable to acquire all the types of knowledge required for implementation of the teaching methods (Goldenberg et al., 2012; Permaul, 2009;

Schucan-Bird et al., 2015). According to this approach, it can be assumed that even when teachers' attitudes toward alternative teaching methods are positive, teachers will have difficulty in applying them without having had practical experience specifically in these teaching methods. Hence, the fifth hypothesis is:

5. The influence of having practical experience with alternative teaching methods on the implementation of alternative teaching methods will be stronger than the influence of simply having positive attitudes towards alternative teaching methods.

The Study Method

Sample and sampling

The sample included 98 participants, of whom 55 were women (56.1%) and 43 were men (43.9%). Six of the participants (6.1%) have a teaching certificate only, 32 (32.7%) have a Bachelor's degree, and 60 (61.2%) have a Master's degree or higher. The participants' age ranged from 24 to 56 years with an average of 42.73 and a standard deviation of 7.65. The years of experience in teaching ranged from 1 year to 34 years, with an average of 18.79 and a standard deviation of 8.21 years.

The sampling method used in the study was cluster sampling, with three randomly selected middle schools in the Arab sector in the northern region of Israel. In each of the three middle schools selected, questionnaires were sent to all of the teachers in the school. In total, 98 teachers completed the questionnaires.

Study tools

- Personal Information Questionnaire. In this questionnaire, the teachers were asked about their gender, age, years of experience in teaching and the subjects they teach.
- Experience with alternative teaching methods questionnaire. This questionnaire included 10 statements in which teachers were asked about the frequency of their experience with alternative teaching methods during their teacher training and during their advanced professional training. An exemplary question: “During my professional training, I had practical experience with project-based learning (PBL) teaching.” The questions on the questionnaire were to be answered on a 4 rank Likert scale between 1 denoting never and 4 denoting very often. The reliability of the tool as internal consistency was calculated as Alpha Cronbach 0.88.
- Implementation of Alternative Teaching Methods Questionnaire. This questionnaire included 10 statements in which teachers were asked about how frequently they apply an alternative teaching method in their teaching. An exemplary question: “I am currently teaching my students using the project based learning method (PBL)”. The questions on the questionnaire were to be answered on a 4 rank Likert scale between 1 denoting never and 4 denoting very often. The reliability of the tool as internal consistency was calculated as Alpha Cronbach 0.89.
- Attitude toward Teaching Methods Questionnaire. The questionnaire is based on an evaluation of the teacher’s attitude toward technology-integrated teaching, developed and validated by Albirini (2006). The questionnaire was translated into Hebrew using a repetitive translation method, and was adapted by the researcher to evaluate attitudes towards the additional teaching methods that the study focused on (project-based learning, exploratory learning, collaborative learning, and frontal teaching). In order to

validate the version that evaluates attitudes toward additional teaching methods other than technology integration (the method used by the original questionnaire), a factor analysis was used as a distinguishing validator. This validator revealed that the attitude towards frontal teaching does indeed constitute a separate factor from attitudes towards the alternative teaching methods. The questionnaire included 22 statements for each of the four alternative teaching methods and for frontal teaching, a total of 110 statements. An exemplary statement: “Project based learning serves the academic needs of students”. Each statement was to be responded to upon a 4 rank Likert scale between 1 denoting strongly disagree and 4 denoting strongly agree. Ten of the 22 statements in each teaching method were opposite. The reliability as the internal consistency of the questionnaires as calculated in the study are as follows: project-based learning: 0.86, exploratory learning: 0.86, collaborative learning: 0.91, technology integrated in teaching: 0.84, frontal teaching: 0.76.

The Study Process and Data Analysis

The researcher requested school Principals to distribute the questionnaires to the teachers. All school Principals cooperated willingly. The Principals distributed the link to the online teacher questionnaire, while clearly stating that although the link was sent by the Principal (in order to maintain the teachers’ personal information private), the Principal does not have access to the results of the questionnaires, nor can he know whether a specific teacher filled out the questionnaires. The teachers were assured that the questionnaires were anonymous and no one but the researcher would have access to the data, only to the combined findings. After the teachers gave their consent on an informed consent form, the teachers completed the questionnaire. After data collection, analysis was performed by using descriptive

statistics analysis, reliability testing, Pearson correlations, and hierarchical regression.

Findings

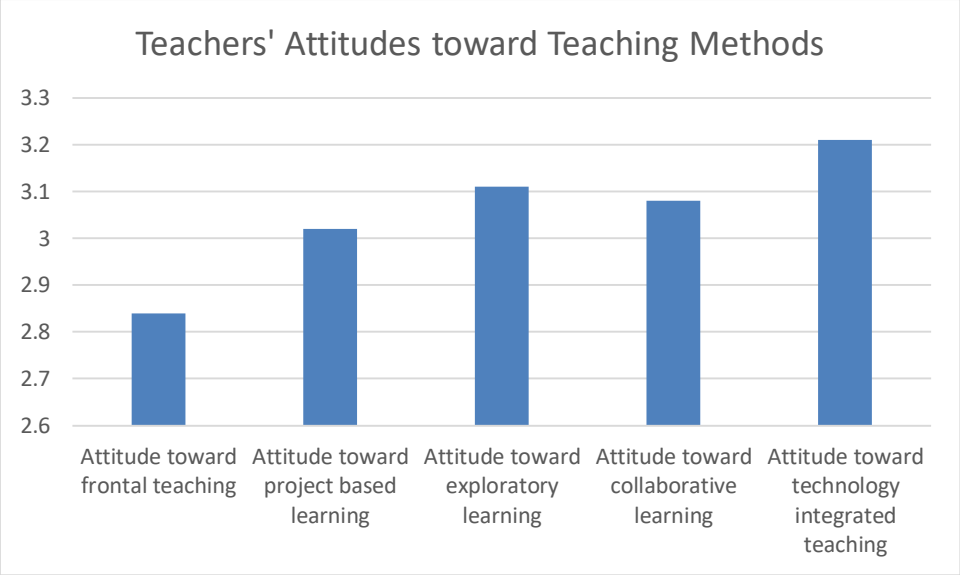
Descriptive Statistics

As can be seen in Table 1, as expected, teachers' attitudes toward alternative teaching methods are more positive than their attitudes toward frontal teaching. This approach is illustrated in Figure 1.

Table 1: Descriptive statistics of the study variables, N=98

Variable	Min.	Max.	Mean	S. Dev.
Experience with alternative teaching methods	1.00	4.00	3.07	0.54
Implementation of alternative teaching methods	1.00	4.00	3.11	0.50
Attitude toward frontal teaching	1.86	3.91	2.84	0.40
Attitude toward project based learning	1.50	4.00	3.02	0.51
Attitude toward exploratory learning	2.27	4.00	3.11	0.42
Attitude toward collaborative learning	2.27	4.00	3.08	0.49
Attitude toward technology integrated teaching	2.18	4.00	3.21	0.46

The values for Experience with Alternative Teaching Methods and the values for Implementation of Alternative Teaching Methods are ranged across the entire scale (1 through 4), indicating that the sample includes a wide range of levels of both experience and implementation of alternative teaching methods.



Factors Influencing the Implementation of Alternative Teaching Methods

In order to determine the factors that influence the implementation of alternative teaching methods, first the background variables were examined using multiple regression analysis. From the background variables of gender, age and years of experience in teaching, only 'years of experience in teaching' is significantly correlated with the rate of implementation of alternative teaching methods (Table 2).

Table 2: Multiple regression to identify correlations between the background variables and the implementation of alternative teaching methods.

Variable	B	β	Significance
Constant	2.998	-	0.000
Gender	0.087	0.086	0.414
Age	0.001	0.164	0.460
Years of experience in teaching	-0.025	-0.432	0.046
Dependent variable: Implementation of alternative teaching methods		R^2=9.9%, R^2_{adj}=7.0%, p=0.020	

The results of the analysis support the first study hypothesis: An inverse relationship was found between years of experience in teaching and the implementation of alternative teaching methods ($\beta = -0.432$, $p < 0.05$). The findings confirm that newer teachers more often apply more alternative teaching methods compared to experienced teachers. Because ‘years of experience’ is the only variable that is significantly correlated with the implementation of alternative teaching methods, only this variable has been transferred to the full model for identifying the factors associated with the implementation of alternative teaching methods by teachers. The full model included four stages of hierarchical regression (Table 3). In the first phase, only the variable of ‘years of experience’ was entered. In the second phase, the attitudes toward alternative teaching methods were entered. In the third phase, the attitude toward frontal (traditional) teaching was also entered. The fourth phase, practical experience with alternative teaching methods was also entered, and was divided into two variables: experience during the teacher training and experience during advanced professional training.

Table 3: Hierarchical regression to identify the factors correlating to the rate of implementation of alternative teaching methods

R^2 phase (ΔR^2)	Variable	B	β	Significance
1 9%	Constant Years of experience	3.447 -0.018	- -0.300	0.000 0.003
2 34% (25%)	Constant Years of experience Attitude toward exploratory learning Attitude toward PBL Attitude toward collaborative learning Attitude toward technology integrated teaching	1.629 -0.021 0.244 0.307 -0.012 0.075	- -0.356 0.204 0.310 -0.011 0.069	0.000 0.000 0.096 0.026 0.945 0.582
3 37% (3%)	Constant Years of experience Attitude toward exploratory learning Attitude toward PBL Attitude toward collaborative learning Attitude toward technology integrated teaching Attitude toward frontal teaching	2.146 -0.021 0.275 0.291 -0.021 0.098 -0.228	- -0.25 0.213 0.293 -0.021 0.091 -0.180	0.000 0.000 0.057 0.032 0.942 0.463 0.036
4 64% (27%)	Constant Years of experience Attitude toward exploratory learning Attitude toward PBL Attitude toward collaborative learning Attitude toward technology integrated teaching Attitude toward frontal teaching Experiment with alternative teaching methods (training) Experiment with alternative teaching methods (advanced training)	1.225 -0.016 0.057 0.120 -0.136 0.203 -0.145 0.330 0.263	- -0.264 0.048 0.121 -0.132 0.187 -0.114 0.367 0.301	0.001 0.000 0.614 0.251 0.289 0.051 0.083 0.002 0.009

The results of the second phase of the analysis only partially confirm the study hypothesis. Among the attitudes toward all alternative teaching methods, only the project-based learning attitudes were significantly correlated with the rate of implementation of alternative teaching methods ($\beta = 0.310$, $p < 0.05$). This relationship, as expected, is direct, meaning that more positive attitudes toward project-based learning are associated with wider application of alternative teaching methods.

The results of the third phase of the analysis confirm the third study hypothesis. As expected, an inverse variation was found between attitudes toward frontal teaching and the rate of implementation of alternative teaching methods (β = -0.180, $p < 0.05$). That is, the more positive the teacher's attitudes toward frontal teaching, the less likely he is to apply alternative teaching methods. These findings indicate that even when controlling the attitudes toward alternative teaching methods, attitudes toward frontal teaching have a separate determination power regarding the implementation of alternative teaching methods.

The results of the fourth phase of the analysis support the fourth and fifth study hypotheses. In accordance with the fourth study hypothesis, the fourth phase of the analysis indicates significant direct correlations between having experience with alternative teaching methods and the rate of implementation of alternative teaching methods, both when the experience was practiced during the teacher training (β = 0.367, $p < 0.01$) and when the experience was during advanced professional training (β = 0.301, $p < 0.01$). Further examination of the results of the fourth phase of the analysis indicates that when ‘experience with alternative teaching methods’ is introduced into the model, the attitude variables lose their significance. This means that the attitudes toward alternative teaching methods as well as those toward frontal teaching do not have power of determination regarding the rate of implementation of alternative teaching methods higher than the power of determination attributed to experience with alternative teaching methods during professional training. These findings confirm the fifth hypothesis: the correlation between practical experience with alternative teaching methods and the implementation of alternative teaching methods is stronger than the correlation of attitudes toward teaching methods.

Discussion and Conclusions

The purpose of this study was to investigate why, despite the high awareness of the advantages of alternative teaching methods, and despite the many attempts to apply them in schools, their actual usage rates remain low. For this purpose, a quantitative study was conducted in order to identify the factors that influence the implementation of alternative teaching methods by teachers. The findings of the study have raised some interesting insights that may shed light on why the usage rates of alternative teaching methods in schools remain low, despite the many attempts to integrate them and to encourage teachers to apply them.

First, the implementation rate of alternative teaching methods was found to be higher among newer teachers. One of the possible explanations for this finding is that, consistent with previous studies (Beck, 2013; Saborit et al., 2016), teacher training programs have evolved and now more encourage trainees to use alternative teaching methods, leading to wider application of alternative teaching methods by new teachers. This finding is optimistic, because if this approach continues, the implementation rate of alternative teaching methods may increase as new teachers enter the system. However, the ‘years of experience in teaching’ continued to be a significant factor related to the rate of implementation of alternative teaching methods, also when introducing the attitudes toward alternative teaching methods and the experience with alternative teaching methods during training. This finding means that newer teachers attempt more often to apply more alternative teaching methods, regardless of their attitudes toward the teaching methods and their experience they have undergone during training. This finding slightly clouds the optimism that emerges from the simple relationship between years of experience and the implementation rate of alternative teaching methods, because it implies that there may be a different explanation for the relationship between teacher seniority and the implementation of alternative teaching methods. According to this explanation, even

teachers who try alternative teaching methods when they are new teachers apply them less as their seniority increases. Because this study is not a longitudinal study, it is not possible to determine between these two explanations based on this study's data. Future research could examine the implementation of alternative teaching methods over time by those teachers and examine whether the implementation is increasing or decreasing, and under what conditions.

Second, unlike previous studies (such as: Han et al., 2015; Laursen et al., 2016; Saborit et al., 2016), that emphasized the importance of attitudes toward alternative teaching methods, it was found that teachers' attitudes toward alternative teaching methods, in themselves, are unrelated to the degree of application of alternative teaching methods. Out of the four alternative teaching methods examined, only project-based learning attitudes were found to be significantly correlated to the application of alternative teaching methods, and furthermore, these attitudes lost their significance when experimenting with alternative teaching methods during training was added to the model. This finding is of great importance, because it shows that positive attitudes toward alternative teaching methods are not enough to assist teachers to actually apply them in the classroom. Teachers may hold very positive attitudes toward alternative teaching methods, and yet, not apply them.

Why, then, do teachers not apply alternative teaching methods in their classrooms, even when they hold positive attitudes toward these teaching methods? The findings of this present study offer two explanations for this phenomenon. The first explanation has to do with teachers' attitudes toward traditional frontal teaching. So far, studies have focused primarily on attitudes toward alternative teaching methods compared with that toward traditional frontal teaching, but have not addressed attitudes toward frontal teaching as a separate variable that stands alone. The findings of this study show that positive attitudes toward frontal teaching are inversely related to the implementation of alternative teaching methods, meaning that teachers

who hold positive attitudes toward frontal teaching would be less likely to apply alternative teaching methods. This finding is innovative both theoretically and methodologically. Methodologically, the finding emphasizes that attitudes towards traditional teaching methods should also be considered as a variable in itself, and not merely residual as a reference point when examining attitudes toward alternative teaching methods. Theoretically, the finding emphasizes the importance of attitudes toward frontal teaching, a variable that was latent until now. Previous studies have described the advantages of the frontal method as one of the reasons that teachers refrain from using alternative teaching methods. Particular mention was made of the much more effort required of teachers to plan and execute lessons using alternative teaching methods (Kashti et al., 2001; Kokotsaki et al., 2016; Thomas, 2000). However, treating attitudes toward frontal teaching as a variable in itself allows for a wider range of factors that lead teachers to retain this method. Teachers may feel that this method is more appropriate for transferring the material taught, or, they may feel that this method is more appropriate for their students or many other factors beyond the required effort in planning and execution of the lessons. Future studies could examine teachers' specific perceptions of frontal teaching, which lead them to choose this method despite the perceived advantages of the alternative teaching methods.

The second (and more important) explanation for teachers' tendency to retain frontal teaching despite their positive attitudes toward alternative teaching methods, is related to the experience with alternative teaching methods during teacher professional training. The findings of this study show that the most important main factor influencing the extent to which alternative teaching methods are applied is practical experience with these teaching methods during teacher professional training (both the teacher-training program and the advanced professional training). According to this explanation, positive attitudes toward alternative teaching methods

are not enough, and without practical experience with these methods, teachers will tend to not implement them. This finding is consistent with fundamental theories of professional learning, in particular the Active Learning Theory and the Social Learning Theory (Permaul, 2009; Schucan-Bird et al., 2015). These theories emphasize the importance of practical experience as part of the learning process. According to these theories, theoretical learning of teaching methods is not enough, and the teacher must experiment with them practically in order for him to feel confident to independently apply them in the classroom (Schauer, 2018). This finding is of the utmost importance for planning teacher training programs, advanced teacher training courses, and for planning significant learning programs. The findings suggest that in order to encourage teachers to use alternative teaching methods and apply them in classrooms, developing positive attitudes among teachers regarding these teaching methods is not enough. Programs should include practical experience in each of the alternative teaching methods they wish to promote, such as: project-based learning, exploratory learning, collaborative learning, and technology integration in teaching. According to the findings of this study, teachers' practical experience with alternative teaching methods is expected to improve the implementation rate of these teaching methods by teachers, thus promoting significant learning (Ratner et al. 2016) and better prepare students for the skills needed for the 21st century (Fisher, 2015).

The main contribution of the study is that it reiterates previous studies that have emphasized the importance of attitudes toward alternative teaching methods among teachers (Kashti et al., 2001; Kumar & Rani, 2016; Saborit et al., 2016; Silm et al., 2017) and shows that the importance of attitudes towards alternative teaching methods among teachers is not enough to cause them to apply alternative teaching methods. The study shows that the variable that explains the rate of implementation of alternative teaching methods by teachers is the practical experience with these

teaching methods, which has both theoretical and practical importance. Theoretically, as mentioned, the findings reinforce theories that emphasize the importance of practical experience in learning (Permaul, 2009; Schucan-Bird et al., 2015). In practical terms, the findings show that teacher training programs can no longer avoid providing practical experience with various alternative teaching methods and provide only theoretical instruction regarding their advantages. This finding is of far-reaching importance because it allows, for the first time, to unravel the paradox that has taken place over many years, in which despite many attempts, throughout several decades, to increase the use of alternative teaching methods (Fisher, 2015; Chu et al., 2017; Clark et al., 2018) in practice/reality the implementation rates of alternative teaching methods remain low (Han et al., 2015; Laursen et al., 2016). The findings of the study offer a practical, and theoretically grounded/secured, approach to a change that will improve teachers' implementation rates of alternative teaching methods.

The secondary contribution of the study is related to teachers' attitudes toward frontal teaching, a variable that has not been examined in itself so far, but only as a reference point relative to attitudes toward alternative teaching methods. The findings of the study show that treating this variable as a variable in itself can teach a lot about teachers' choices when deciding the teaching methods they apply on different occasions.

This study has several limitations. **First**, the study is based on self-reported questionnaires, and is therefore exposed to biases such as social rationale bias, which may influence the report of teacher attitudes. **Second**, the study is based on correlations and therefore it is difficult to interpret the statistical relationships between the variables and to conclude the reasons.

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