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RESEARCH ARTICLE (PEER-REVIEWED)

## Is the Flipped Classroom Method Useful for Teaching Project Management?

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### Abstract

A teaching method known as the flipped classroom has become increasingly popular in recent years, and the method is now widely used around the world at all levels of the education system. This paper seeks to examine and elucidate the concept of the flipped classroom method as well as scrutinize its varying manifestations within educational settings, focusing particularly on the question of whether the teaching method is a fruitful teaching strategy for project management. Data gathering was based on an analysis of research literature focusing on the application of the flipped classroom as well as interviews conducted with both teachers and students associated with a master's degree program in project management at Reykjavik University. The interviews sought to extract perspectives of both teachers and students concerning their experiences of the flipped classroom method in contrast to conventional teaching methods. Finally, the paper will present the findings from an analysis comparing test results from an international certification examination in project management for two groups of students. One group attended lessons where the flipped classroom method was applied whereas the other group was instructed using traditional teaching methods.

The findings of the study reveal that the flipped classroom method is a fruitful and relevant strategy for teaching and learning project management. The findings show that the students were more positive toward the method than the teachers. Furthermore, the students were generally more receptive to new teaching methods than the teachers were. 60% of the students who attended lessons that used the flipped classroom claimed that it had aided them in preparing for the certification examination.

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## Keywords

Teaching; flipped classroom

## Introduction

Throughout the ages, education and teaching have followed a repeated pattern. The teacher is usually the source of knowledge who mediates information to his students in the classroom as well as encouraging them to attend to their homework. The teacher plays the critical role in the mediation of information and his existence is the premise that successful education is based on. Project management is a young academic discipline and research is scarce about the means by which it can most fruitfully be taught. Rapid advances in information technology and society's growing emphasis on independent learning call for revitalized approaches to teaching and education on most levels of schooling and the teacher's role is consequentially changing. A pedagogical method called the flipped classroom has been gaining ground over the recent years, and the method has been well received by students and teachers alike, around the world and across school levels. The main purpose of this paper is to examine the possibilities of the flipped classroom within the context of project management education. More specifically, the paper seeks to answer the following research questions:

1. Is the flipped classroom an appropriate method to teach project management?
2. Are students and teachers ready to make use of the flipped classroom method?
3. Can the method lead to better management of time and workload for both students and teachers?
4. Is the teacher becoming a redundant aspect of the learning process?

## Theoretical Background

In order to better address the research questions, it is crucial to elucidate some of the key concepts brought to bear in the study. The flipped classroom is a teaching method which is primarily concerned with the student's needs and encourages the student to seek his solutions, work collaboratively and engage with authentic assignments (Baker 2000). The flipped classroom places the active aspect of learning into the classroom and moves the passive side of learning, such as reading and observing lectures, outside the walls of the school. Framed in simpler terms, the flipped classroom is based on the idea that the teacher's contribution mainly takes place on the internet where the student can access the teaching material as often as he needs in order to acquire a proper grasp of the subject at hand (Keilire.d.-c). When the student arrives at school, the active engagement with the subject matter begins, which usually involves group work (Baker 2000).

It can be difficult to measure the direct impact that different teaching methods have on academic success. The definitions and approaches to concepts that ground varying teaching methods are too dissimilar, and they are often separated by so many degrees that it becomes impossible to conduct a comparative analysis. Prince (2000) investigated active learning which figures as the hard kernel of the ideology of the flipped classroom. Active learning, from the student's perspective, is when the student actively seeks to discover the purpose of his studies. The student is at the center of active learning, the teaching is aimed at his needs and the teacher's work entails assisting the student in his learning. Many studies focusing on various

school levels have shown that significant learning takes place when the student is actively engaged with his tasks ([Prince 2004](#)).

There is considerable literature regarding the methodology of the flipped classroom, and the method has gone under various names, for instance, the inverted classroom, blended teaching and active learning. The concept, therefore, does not lend itself to one exhaustive definition - it is an educational ideology which has developed parallel to recent advancements of information technology.

The history of the flipped classroom method is brief in comparison to more traditional teaching methods. Despite the scarcity of scientific research in the field, education researchers have sought to examine the benefits of and perspectives toward the flipped classroom method. The flipped classroom has its roots in the information technology revolution, with the emergence of social media platforms such as YouTube, Skype, and Facebook. Another explosion occurred took place alongside the information revolution with the arrival of smartphone technologies such as iPhone and iPad, and internet access worldwide spread even further. It is, therefore, possible to claim that information technology was the necessary premise for the rise of the flipped classroom.

Academics generally agree that the history of the flipped classroom can be traced to the year 2004, associated with the writings of the American scholars Salman Kahn, Jonathan Bergmann, and Aaron Sams. Salman Kahn was born in 1976 and is best-known today for the Kahn Academy, which is an educational organization and a fountain of knowledge that hosts thousands of educational videos on the internet, used by millions of individuals around the world. Kahn's adventure is thought to have begun when he was tutoring his cousin who lived in another country and attempted to explain math problems through short video clips. Kahn required a platform to store the videos, so he uploaded them to YouTube. Kahn's math clips were shared between individuals on the internet, and soon Kahn began receiving appreciative emails from parents of children with learning difficulties ([Kahn 2011](#)). Jonathan Bergmann and Aaron Sams began teaching together in 2006 at Woodland Park High School in Colorado. They were both veterans of teaching when they began their collaboration at the school's chemistry department, attended by 950 students. They had rigorously planned the teaching for the winter semester but soon noticed a problem concerning the poor attendance of athletics students who would regularly be away from school to participate in sports competitions around the country. Colorado is a rurally populated state, and distances are greater than what populations are accustomed to in most urban areas. In order to meet the need of these students who struggled to keep up with the studies in class, Sams and Bergmann decided to record instructional videos which they would then upload to YouTube ([Bergmann & Sams 2012](#)).

Keilir Atlantic Centre of Excellence is the most advanced school in Iceland regarding applying the flipped classroom method. Keilir is a non-profit educational institution, founded in 2007, and is located in Reykjanesbær, close to the Keflavik International Airport. Keilir began using the flipped classroom method in 2012 which applied to all school subjects (Keilir, e.d.-b). Rakei Viggósdóttir (2014) studied the attitude toward the flipped classroom among the school's students and teachers which included, among other things, three in-depth interviews with teachers from various subjects and qualitative studies focusing on students' perspectives. Viggósdóttir's findings revealed that the teachers believed that the flipped classroom was more beneficial than traditional teaching methods. In that context, the teachers noted individualized learning, increased activity and a more personalized approach to each student as the main advantages of the method. Noted disadvantages were, among others, the

fear of technological aspects of the method and students' increased responsibility for their studies. Moreover, they reported that the method might not be suitable for all students and that the act of self-observation in the recordings awoke some discomfort. The teachers believed that the students' attitudes toward the method were positive and further expressed that the view toward the flipped classroom method was generally favorable in the school ([Viggósdóttir 2014](#)). 90.7% of students reported that they considered the flipped classroom better suited to their needs than traditional teaching methods, and noted individualized learning as the biggest advantage. Sigrún Ása Magnúsdóttir's findings from a study on the application of the flipped classroom in Keilir(ed-a) showed that students and teachers found that well-defined, brief and concise instructional videos were best suited to achieve their end ([Magnúsdóttir 2014](#)). These findings echo Salman Kahn's ideas concerning the length of instructional videos.

In 2012, Adam Butt conducted a study on the application of the flipped classroom method at the Australian National University (ANU), named "Student Views on the use of a Flipped Classroom Approach: Evidence from Australia." ([Butt 2013](#)). The study was set to compare, on the one hand, the views of students and teachers to traditional teaching methods (the student listens to the teacher deliver a lecture in the classroom) and their attitude toward the flipped classroom, on the other. The study focused mainly on the most beneficial ways to manage students' time and which teaching method left the biggest mark. Two questionnaires were conducted, one in July 2012 and the other one later the same year ([Butt 2013](#)). The findings brought to light that students generally considered active learning to be the best way to learn, with reading in second place, followed by listening in third place. A majority of the students believed that group work in conjunction with individual work was a beneficial way to learn ([Butt 2013](#)). [Biggs and Tang \(2007\)](#) point out that the structure of each course should be elucidated at the beginning of the term, as well as assessment criteria and expected contributions from students. In active learning, the student is always prioritized over the teacher ([Biggs and Tang 2007](#)). [Kramer, Sankar and Hingorani \(1995\)](#) suggested the possibility that information technology could be utilized to provide students with digital access to a project manager which would limit the teacher's presence in the classroom. The impact of distance learning on students was examined with regard to how their studies would be influenced if they were given the opportunity to connect school assignments with actual and practical situations ([Kramer, Sankar and Hingorani 1995](#)).

Findings from studies in the field of project management education generally agree that it is important to place the teaching into a context of reality and encourage students to engage with actual events and situations as much as possible. [Cook and Olson \(2006\)](#) investigated a group of project management students who were working on a collaborative project that revolved around building a tower using spaghetti and other similar rudimentary building material. The study showed that by means of connecting the basic principles of project management to the building of the tower, and by introducing the teaching material into the process in conjunction with the construction, the students were able to gain a better understanding of the teaching material and were more equipped at achieving their learning goals ([Cook and Olson 2006](#)).

In 2008, an experiment was conducted in the UK with the aim of examining further the importance and impact of contextualizing practical situations and job market with studies in project management. [Alan, Gale, Brown and Kidd \(2008\)](#) studied a group of project management students at the University of Manchester. In order to properly emphasize this connection between the studies and the job market, the university sought cooperation with large businesses such as Rolls-Royce and Goodrich as an incentive for the students to focus constructively on the studies ([Alan, Gale, Brown and Kidd 2008](#)). In addition to studying the

impact of maintaining a strong bond to the job market, the researchers looked at the influence of applying blended teaching methods.

[Ojiako, Ashleigh, Chipulu and Maguire \(2011\)](#) studied how a group of project management students reacted to varying teaching methods, where they sought to gauge which method the students perceived as the most favorable. According to the students, diverse teaching methods and the practical application of the studies to real situations ranked as the most fruitful teaching strategies ([Ojiako et al. 2011](#)). Ojiako, Chipulu and Wang (2012) underline the importance of using blended learning for project management teaching. They studied why students preferred project management courses that offered diverse teaching methods as well as courses that utilized the internet as a learning platform ([Ashleigh et al. 2012](#)). The students' opinions were discussed and analyzed from varying perspectives, and the findings were divided into five sub-categories. The findings reveal that the most fruitful way to facilitate students' skills to social, technological and ideological aspects, resides in the application of blended learning in conjunction with the internet. The studies must be flexible enough to meet the needs of different students as well as organized and clearly defined ([Ashleigh et al. 2012](#)). Moreover, internet instruction is best suited for students that grapple with learning difficulties ([Ashleigh et al. 2012](#)).

[Cordoba and Piki \(2012\)](#) researched the effectivity of active learning in groups as a teaching method for students in project management. Group work is considered a successful means to properly prepare students for actual situations on the job market as project managers. Working in groups allows individuals to reflect on themselves and their ideas which leads to increased understanding. Group work proved to be an appropriate way to prepare the students for both the predictable and unpredictable situations that emerged in the assignments. Moreover, group work removes the student from the comfort zone of individual work and places him into a real-world situation where he is faced with different individuals and unfamiliar circumstances ([Cordoba and Piki 2012](#)). These findings support ideas that promote the positive impact of diverse teaching methods and it is hence important to continue developing project management education along these lines ([Cordoba and Piki 2012](#)).

## Methodology

Both qualitative and quantitative research methods were used in the process of seeking answers to the research questions. Questionnaires were sent to 116 master's degree students and graduates in project management (MPM) at Reykjavík University. In-depth interviews were conducted with innovators and managers of the MPM studies at Reykjavík University – which has been taught in Iceland since 2005. The same individuals set up the Project Management and Leadership Training course in 2003, and which is taught in collaboration with continuing education programs at the University of Iceland and the University of Akureyri. Additionally, in-depth interviews were conducted with two MPM students at Reykjavík University. Finally, questionnaires were sent to 20 project management teachers with the aim of extracting their views toward the flipped classroom method.

The participating students were randomly selected. The questions were framed in terms of pre-decided talking points, but an effort was made to establish a relaxed atmosphere for the interviewees where the participant was able to talk freely. All participants gave their consent for the interviews being recorded. The point of departure for the interview with the MPM managers was a SWOT analysis of the methodology that guides the flipped classroom, where the discussion revolved around the strengths, weaknesses, threats and general

opportunities entailed in the flipped classroom method. In order to gain a deeper insight into the technological side of the flipped classroom, an in-depth interview was conducted with Mr. Björgvin Ívar Guðbrandsson, who, as well as being a teacher, has vast experience of information technology, the flipped classroom and teaching material development. A SWOT analysis was chosen to frame the findings extracted from all the in-depth interviews conducted in the study.

An emphasis was placed on investigating the views of both students and teachers to the flipped classroom method, given the obvious fact that the two groups are intertwined. The questionnaire was created using Google docs and a link to the questions sent to students via email or uploaded to the Facebook page of both groups. The teachers were approached through the same technology, but they received their list only via email. The questionnaire was written in English since many of the teachers are not fluent in Icelandic. The problematic aspect of sending a questionnaire through these means is that it was difficult to ensure that the participants responded only once to the questions since Google Docs cannot be closed once participation is completed. However, this option was considered highly unlikely. To ensure better responses, the questionnaires were designed to be brief and concise. Firstly, a definition of the flipped classroom method was provided at the top of the questionnaire for both the students and the teachers. The in-depth interviews also commenced with a definition of the flipped classroom to make sure everyone had the same understanding of the concept.

Results from IPMA Level D certification examinations from the period 2009-2016 were scrutinized with the aim of examining whether there was a measurable difference in grade averages. The main reading material for the test is a translation of an international document which lists competence elements of project management, called ICB3.0 (IPMA Competence Baseline). During the second half of the assessment period, the flipped classroom method was used to teach this material, whereas more conventional teaching methods had dominated the first half. All students' test results were analyzed and grade averages calculated to see if there emerged any significant differences between the two periods. The Level D certification examination of the Project Management Association of Iceland are standardized project management tests which are recognized by the IPMA (International Project Management Association). In 2014, the teaching material for the Level D test became accessible on the internet for the first time, for the groups of students that are a part of this study. The teaching material consists of slides that feature voice-over and illustrations for further clarifications. It is then stored on a website that is specifically designed to construct teaching material, called bContext (<http://bcontext.com/user/dashboard/groups/bfiles/7320>). The Level D test is largely based on standardized project management concepts which the student is expected to familiarise himself with. Instructional videos were created concerning all the concepts from the ICB 3.0 competence baseline and then made available on the internet. In short video clips, the teacher explains the definition of each concept through verbal instruction and visual representation, which the student can observe as often as he requires. 636 Level D tests were examined, all of which were results from MPM students and students from the program Project Management and Leadership Training. The information provided in this paper shows calculated averages for each year.

## Results

The questionnaires were sent to a total of 20 teachers and 116 project management students. The response rate among teachers was 45% and roughly 85% among students.

## Teachers

Views toward the flipped classroom method were analysed, and teachers asked whether they were familiar with the term and whether they had experience of its application. Roughly 33% of the teachers knew the method and had utilized it in their teaching to some extent. 22% of the teachers considered the flipped classroom a fruitful teaching strategy and 56% claimed that it was appropriate for select courses. No teacher believed that the flipped classroom was an unfruitful or inappropriate teaching method, but 22% left the question unanswered. 44.5% teachers said they were unable to claim whether the flipped classroom could increase the quality of project management education, while the same proportion answered the same question affirmatively. Asked if the flipped classroom could lessen workload and save time, 33% of teachers answered positively, and 33% responded negatively, whereas 12% said they did not know. The central reason as to why the teachers yet adopted the flipped classroom method was insufficient knowledge concerning it.

## Students

Almost 60% of the students were familiar with the flipped classroom concept, and 22% had previously encountered it in their studies. Roughly 33% of students claimed that the flipped classroom method was a successful means to learn project management and 53% said that the method was particularly well suited for select courses. 51% of students said that they did not know whether the flipped classroom would increase the quality of project management education whereas 44% of students responded affirmatively to the same question. Differing opinions emerged in relation to the question of where and how the method would be most successfully applied, for example: *when learning revolves around lecturing, when complicated methods are being taught, in all courses or to some extent, in order to better prepare classes, for courses that mainly revolve around conceptual understanding, in courses that have more to do with practical aspects rather than human and social elements*. Almost 63% of students believed that the flipped classroom could lead to more effective management of time/work and almost 30% claimed that they were unsure. 8.1% thought that the flipped classroom would not save time/work. Almost 93% of students said they would make use of instructional videos on the internet if such would be made available.

## The impact of the flipped classroom on Level D tests

42 students out of 99, or roughly 42%, claimed to have either fully or partly utilized the bContext lessons on the internet. Almost 58% of the students said that they had not made use of the lessons or marked the question as irrelevant. Of the 42 students that used the bContext lessons for preparation, 25 or almost 60% claimed that the lessons had been useful. Of those, 15 students, or almost 36%, said that the bContext lessons had proven of only limited use.

The development of test scores over the years extracted from the Project Management Association of Iceland Level D tests are presented in Table 1. The number of students that participated in these tests each year ranged from 33-84, a total of 636 students.

Table 1 The grade average for project management students on the Level D test, from 2009-2016.

Year	Grade
2009	7.6
2010	7.6
2011	7.7
2012	7.7
2013	7.4
2014	7.8
2015	7.6
2016	7.7

The flipped classroom method was first adopted in 2014. The grade average for the years 2009-2013 is 7.6 whereas the average for 2014-2016 is 7.7. This difference is not significant.

The following table lists findings from the in-depth interviews with teachers and students in project management. The information is presented using SWOT analysis which evaluates the strengths (s), weaknesses (w), opportunities (o) and threats (t) of applying the flipped classroom method to teach project management.

## Discussion

The flipped classroom method is an educational strategy grounded in teaching methods that have been practiced for years. Group work, active learning, and blended teaching methods are not new teaching strategies, and as a result, the flipped classroom is not as new as it might appear at first sight. What is novel about the method, however, is the way in which it fused with the progression of information technology. The ability to upload lessons on the internet entails a multitude of opportunities for both students and teachers.

The findings of this study correspond with other studies that have underlined project management students' positive attitudes toward the flipped classroom method, which affords increased freedom and individualized learning. 93% of students in project management expressed that they would make use of instructional videos if available. Students continuously seek ways to manage time and productivity more efficiently. The flipped classroom method meets those demands and provides the busy student with further possibilities of acquiring new knowledge. It is important to keep in mind that the flipped classroom is not the ultimate solution which replaces all other teaching methods. Rather, the method can be adopted alongside other teaching strategies. The flipped classroom is not suitable for everyone, and it always premised on the student's contributions and efforts, as is the case with other teaching methods.

Project management is a practical discipline that cannot be learned solely through a textbook; it revolves around dedication and commitment which is best acquired through experience and practice. The vast part of project management studies takes place through active learning where students work in groups with practical assignments. However, a part of project management studies is based on learning standards, concept and complex methodologies. The flipped classroom is, therefore, an ideal teaching method for project management education. By recording instructional lessons covering the most dry and complicated material,

**Table 2** show findings extracted from a SWOT analysis of the flipped classroom method. The findings are based on in-depth interviews conducted with students and teachers.

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>-The students decide when to view lectures and can observe them as often as they choose.</li> <li>-The teacher's time is rather spent getting acquainted with students and evaluating their competencies in relation to the studies.</li> <li>-Classroom time is rather used for delving deeper into subjects and students have more time to engage with the technology and methods being taught.</li> <li>-Well suited for project management since it is a practical science and practice makes perfect above all else.</li> <li>-Gives the teacher the chance to prepare lectures in a more consistent manner and focus on the most important aspects of the teaching.</li> <li>-The teacher's daily routine no longer applicable, as long as he remembers to record the lectures when he is ready to do so.</li> <li>-Classroom time used more consistently given that students are well prepared and discussions therefore substantial and meaningful.</li> <li>-In the perfect world, the student enters the classroom after having listened to the lecture, and practical work can commence immediately.</li> <li>-Well suited for students that struggle to read. Individualised learning.</li> <li>-The method encourages students to be well-prepared and engage meaningfully with the subject matters.</li> <li>-Encourages students and teachers to sharpen their focus.</li> <li>-It is easier for individuals to recall their contribution and work more objectively.</li> <li>-Well suited for teaching dry and challenging material that is not appropriate for the lecture form.</li> <li>-The subject becomes readily accessible for the student.</li> <li>-It is easier to explain complicated issues in videos that can be revisited as often as the student desires.</li> </ul>	<ul style="list-style-type: none"> <li>-The teacher loses touch with the teaching material.</li> <li>-Students miss unexpected aspects which can take place through classroom discussions between students and teachers.</li> <li>-It is more difficult for the teacher to gauge the student's efforts, i.e., has the student read the teaching material? Instruction changes if the teacher has to assume that the student has completed the reading.</li> <li>-The teacher cannot know whether the student is prepared or not unless students indicate otherwise.</li> <li>-Encourages the use of computers.</li> <li>-The students are fed too much information.</li> <li>-One cannot assume the same performance from a teacher on video as in a live traditional lecture.</li> <li>-Undynamic discussion between students and teacher.</li> <li>-The flipped classroom is not suited for all.</li> <li>-Internet lectures cannot extend beyond 15 minutes.</li> <li>-The method calls for much planning and discipline on behalf of the teacher, e.g., ensuring that lessons are uploaded to the internet in a timely manner.</li> <li>-It is imperative to guarantee good sound quality to the recordings to avoid unfruitful disruptions.</li> <li>-Technical equipment must be superior, e.g., sound recordings and illustration tools for diagrams.</li> <li>-The teacher must sketch vivid diagrams accompanied by clearly-defined intentions.</li> </ul>

Threats	Opportunities
<ul style="list-style-type: none"> <li>-The teacher might be forced to re-evaluate his role which can prove difficult.</li> <li>-Some teachers fear the method because people fear the unknown. Teachers fear becoming redundant in the future.</li> <li>-The flipped classroom is a threat to the trusted and predictable existence of the teacher.</li> <li>-Other schools could take over project management education by applying only the flipped classroom method.</li> <li>-The students could become more knowledgeable than the teacher, a development feared by the latter.</li> <li>-Technology is not for everyone, might become a problem for some teachers.</li> <li>-Computers have become too dominant. People use computers too much.</li> <li>-Preparing for lectures demands much work, and the teachers need a good reason to engage in such efforts.</li> <li>-Uncertain situations can emerge in flipped classrooms, and uncertainty leads to fear. What is the teacher to do if he cannot find anything to discuss?</li> <li>-Uncertainty concerning property rights and storage of teaching material. Internet storage exposes a risk of theft.</li> <li>-A disappearance of romance. Do we want to merge fully with technology?</li> <li>-The teacher must adopt an assignment-oriented approach if the flipped classroom is to work. This calls for different assessment strategies, and the flipped classroom makes different demands.</li> </ul>	<ul style="list-style-type: none"> <li>-Possible to engage with teaching material alongside another task, e.g., exercising, traveling, and so on.</li> <li>-The textbook is not suited for all students; some learn more by listening, observing, or both.</li> <li>-Individualised teaching method where the students' time is more efficiently managed.</li> <li>-An opportunity of the teacher to improve himself as a teacher and do better, dare to try new things.</li> <li>-Opportunities to increase students' responsibilities and more opportunities for the teacher to gauge the students' level of comprehension concerning the teaching material.</li> <li>-Time and work can be saved for both students and teachers in certain courses. Initial effort and workload which though remains for years to come.</li> <li>-Dry and tedious material can be made more accessible through an entertaining video. Can be applied to project management.</li> <li>-A chance to offer the student more value.</li> <li>-More time to dedicate the teaching material and increased opportunities for practical work.</li> <li>-Students put more pressure on each other; no one wants to work with a student who is ill-prepared.</li> <li>-Progression resides with computer technology, and we must seek means to keep up with it.</li> <li>-Teachers need to be open to new experiences and dare to develop in their profession. Partaking in creating something new is exciting.</li> <li>-Project management concerns efficient management, which is not learned from a book but instead through experience and activity.</li> </ul>

the teacher is provided with an opportunity to teach it in a lively and entertaining way aided by information technology. The flipped classroom allows students to become active project management learners, they are afforded increased space to adopt new material and classroom time is more efficiently managed. 85% response rate to the questionnaires sent to students indicates that they are interested in the flipped classroom method and becoming more acquainted with teaching methods that increase productivity and manage time more effectively.

The analysis of the development of Level D grade averages shows that even though averages for the period 2014-2016 were marginally higher than 2009-2013, the difference is not significant, however tempting it is to define this difference as an indication that the flipped classroom method is delivering higher grades. It is interesting to note that 60% of the students that utilized bContext thought that the teaching material had provided vast support, which strongly suggests that this method is a successful way to learn dry material such as the ICB framework document. An analysis of the test results from all students over a

six-year period shows the grade average peaks at 2014 for the eight years that were examined. The explanations for these grade oscillations between years can be that the difficulty level of the tests varies, even though the tests are standardized and approved by the IPMA. It will be interesting to observe how the Level D test scores develop in proportion to the growing application of the flipped classroom method.

There can be little doubt that project management students are prepared to engage with the flipped classroom method. Teachers are a different matter, who are not as intrigued by new methodologies, because it could seem at first that their gain would be insubstantial in comparison to the students. The low response rate among teachers, or 45%, suggests this limited interest. Moreover, the teachers' answers were rather brief and once again indicated limited interest in the method. This meagre interest can be partially explained by the fact that they are unfamiliar with the method. Another explanation might be that they are perhaps afraid of becoming redundant. People often fear the unknown, however, teachers' fears are most likely unfounded. The teacher plays an imperative role in the flipped classroom; delivering lively and diverse lessons as well as guiding the students in group work and assignments. Project management teachers should be prepared to develop as professionals and service students to the utmost of their abilities. Through the flipped classroom, the predictable existence of the teacher disappears, and he is forced to re-evaluate his work which is a difficult task for many teachers in the profession. However, teachers should jump at the opportunity for professional development and travel with the current of modernity. Information technology is rapidly progressing, and computers play an ever-growing role in people's lives. In order to adopt and teach the flipped classroom method, teachers will have to overcome their technological limitations. The flipped classroom makes the demand that teachers be ready to present their lessons in sharp and focused ways through short video clips where they are required to re-think the structure of their classroom.

The flipped classroom offers vast potential for teachers and no less for students. The teachers whose central goal it is to teach and service their students are quick to notice the benefits of the flipped classroom. The instructional videos require considerable work but this effort rewards itself in the classroom, and the teaching material can be reused between years. The flipped classroom method affords the teacher more opportunities for building stronger connections with his students.

## Summary

The flipped classroom appears to be a fruitful methodology to teach project management. The method is an individualized learning strategy which offers teachers increased opportunities to mediate knowledge to their project management students. The flipped classroom is not for everyone, as is the case with other teaching methods, but the method multiplies students' choices, and he is given increased flexibility in engaging with the teaching material. Students are generally ready to adopt this new method, whereas teachers seem more sceptical toward the consequences of the flipped classroom due perhaps to a fear that their role will undergo fundamental changes, coupled with worries regarding increased workload. Nevertheless, there is no reason for the teacher to fear that he will become irrelevant. On the contrary, teachers play a key role in the flipped classroom strategy which though requires them to redefine their role as teachers, as well as adopting new technologies and fresh ideas. In fact, the flipped classroom method depends on the teacher's structured preparation and planning, as well as a robust information system which calls for precision in the structuring and recording of the teaching material and its mediation to the students.

This study is limited given the poor response rate of the teachers and the fact that it is difficult to generalize about the role played by the Context teaching material in the Level D test results. It would, therefore, prove informative to conduct further research into the application of the flipped classroom method in project management teaching in Iceland and look more closely into how the teaching strategy is received by both students and teachers.

## About the Authors



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