EDUCATIONAL INNOVATION THROUGH PARTICIPATORY ACTIVITIES

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Abstract

The paper describes a new challenge for university teachers. The theory of 'attention deficit' was first used by Simon (1971) to describe the emergence of new challenges in an information-rich world. We use this theory to describe the emerging challenge of 'partial attention' in the modern classroom. The present study describes participatory activities as a method to increase the students' attention. A collection of 320 responses is used to discuss the relevance of participatory activities.

Keywords: New Challenge; Partial Attention; Participatory Activities.

1. INTRODUCTION

The management of the students' attention in class is an emerging challenge for university teachers. The wide range of Internet search functions has gradually disrupted the way students learn, but the old idea of using paper participatory activities has not gone out of fashion in the classroom. Today's students often prefer to use their computer for taking notes and finding information online, but using paper and pencil exercises in the classroom is still a valid method. The question is no longer *if* new learning technologies should be used, but rather finding new ways of combining new learning technologies – both digital and physical – to optimize the current teaching at university. In fact, the old idea of participatory classroom activities has become increasingly important during the past decade. The reason for this is not only due to the continuing introduction of new information and communication technologies, but also due to the new and emerging challenge that we refer to as 'partial attention' in class. Simon (1971) describes the management of attention as an emerging challenge in an information-rich world. We apply this theory to contribute to the dialogue about the value of new learning technologies at university by pointing out the importance of managing the students' attention in the classroom. It is widely known that motivation and learning are key factors for higher education,

but it is less widely known that attention is another essential factor. Student attention has become an increasingly important challenge for university teachers especially during the past five years. We present the results of a survey to evaluate the effect of participatory classroom exercises in relation to five factors: (1) Motivation, (2) Attention, (3) Learning, (4) Innovation, and (5) Stimulation. We explore the connections with educational innovation through participatory exercises in relation to these five factors with the goal to identify the most important factors.

2. METHODOLOGY

We used the Google Web Survey to gather data in December 2013. We received 320 responses from 40 students, which corresponds to a response rate of 80%. The small sample size is a critical limitation, but the present study is nevertheless suggested to be a valuable starting point for future research on educational innovation through participatory activities. We used the business model canvas (Osterwalder et al., 2010) as a framework to evaluate the advantages of using participatory exercises in class. After the exercise, we asked three questions about the students' prior knowledge, motivation, and demand for interactive exercises to establish a general overview. Then, we designed a five-factor model to explore, which of these factors would be considered the most important for improving the students' ability to learn. The responses from two groups of students from 15 countries were compared to evaluate the potential of educational innovation through participatory exercises. The demographics of the sample are described in Table 1.1.

Table 1.1.
About the data sample

Criteria	Count	Percent
Male	13	32.5%
Female	27	67.5%
National	19	47.5%
International	21	52.5%
Management	23	57.5%
Economics	9	22.5%
Engineering	5	12.5%
Other	3	7.5%
Total	40	100.0%

Note: Countries of origin: Spain (15), Germany (6), Belgium (3), USA (2), South Korea (2), Czech Republic (2), Romania (2), Lithuania (1), Finland (1), Sweden (1), Russia (1), Italy (1), Holland (1), Bulgaria (1) and Ecuador (1).

We compare the results of two classes: (i) a Spanish and (ii) an international class of students both within the field of management at the Polytechnic University of Valencia in Fall 2013. The same instructions were provided to both classes. We

divided the Spanish students into five groups with 3-4 persons in each group, while the international class consisted of seven groups with 3-4 persons in each group. Each group selected a secretary to fill in the information in the canvas and to present the results of the exercise, while a general secretary was appointed by the course instructors to register the names of the participants of each group. Finally, we appointed three observers to observe and take note of how the groups worked with the exercise, which in itself was an interesting experiment. This way the students were activated, assuming clearly defined roles. The responses were analyzed via Google Analytical Summaries, Excel Tabulations, and SPSS Procedures.

3. RESULTS

Key findings of three general questions

The experiment suggests that the students believe that the combination between theories, practical tools, and interactive exercises is an important factor for the learning of new concepts. In fact, 97.5% of the students would like interactive exercises in the future. Next, the survey confirms this result by asking explicitly if interactive exercises are motivating. Finally, the third question indicates that 37.5% of the students had prior knowledge about the canvas, which was used to facilitate the group exercise. The outcome of the first part of the survey is described in table 1.2.

Table 1.2. Demand, Motivation and Prior Knowledge

	Male, n=13 (32.5%)		Female, n=27 (67.5%)		
	Yes	No	Yes	No	Total, n=40
1. Would you like interactive exercises in the future?					
a. Economics	2 (5.0%)	0 (0.0%)	7 (17.5%)	0 (0.0%)	9 (22.5%)
b. Management	6 (15.0%)	0 (0.0%)	16 (40.0%)	1 (2.5%)	23 (57.5%)
c. Engineering	3 (7.5%)	0 (0.0%)	2 (5.0%)	0 (0.0%)	5 (12.5%)
d. Other	2 (5.0%)	0 (0.0%)	1 (2.5%)	0 (0.0%)	3 (7.5%)
Total	13 (32.5%)	0 (0.0%)	26 (65.0%)	1 (2.5%)	40 (100.0%)
2. Do interactive exercises motivate you?					
a. Economics	2 (5.0%)	0 (0.0%)	6 (15.0%)	1 (2.5%)	9 (22.5%)
b. Management	6 (15.0%)	0 (0.0%)	17 (42.5%)	0 (0.0%)	23 (57.5%)
c. Engineering	3 (7.5%)	0 (0.0%)	2 (5.0%)	0 (0.0%)	5 (12.5%)
d. Other	2 (5.0%)	0 (0.0%)	1 (2.5%)	0 (0.0%)	3 (7.5%)
Total	13 (32.5%)	0 (0.0%)	26 (65.0%)	1 (2.5%)	40 (100.0%)
3. Did you know the canvas before the course?					
a. Economics	0 (0.0%)	2 (5.0%)	3 (7.5%)	4 (10.0%)	9 (22.5%)
b. Management	4 (10.0%)	2 (5.0%)	4 (10.0%)	13 (32.5%)	23 (57.5%)
c. Engineering	2 (5.0%)	1 (2.5%)	1 (2.5%)	1 (2.5%)	5 (12.5%)
d. Other	0 (0.0%)	2 (5.0%)	1 (2.5%)	0 (0.0%)	3 (7.5%)
Total	6 (15.0%)	7 (17.5%)	9 (22.5%)	18 (45.0%)	40 (100.0%)

Note: A total of 62.5% of the students responded they did not have prior knowledge of the tool that was used for the experiment.

The first three questions confirm a strong demand for classroom participatory exercises. The results show that students across the different fields of study agree on the importance of interactive exercises in class. This result was confirmed by both students with or without prior knowledge of the tool. The only surprise of the first three questions was that the majority of the students within the field of management did not know the tool before attending the class, since the canvas is an important management tool for analyzing business models.

Key findings of the five-factor analysis

The key findings of the survey are described within the five factors. Each factor received 40 responses to identify the most important factors for facilitating educational innovation through participatory exercises. The national and international students independently reached the same conclusions about the importance of the five factors. Although, the national students rated the five factors slightly higher in general in comparison to the international student, the responses follow the exact same general pattern. The average values (Mean) and standard deviations (SD) of the 200 responses (n=200) are described in table 1.3.

Table 1.3. Five-factor analysis

| Construct	National ($n = 65$)	Intern. ($n = 135$)	Overall ($n = 200$)
	Mean (SD)	Mean (SD)	Mean (SD)
(1) Motivation	6.2 (0.7)	6.0 (0.8)	6.1 (0.8)
(2) Attention	6.2 (0.6)	6.0 (0.9)	6.1 (0.8)
(3) Learning	6.3 (0.6)	5.9 (0.8)	6.1 (0.7)
(4) Innovation	5.7 (1.4)	5.0 (1.9)	5.4 (1.7)
(5) Stimulation	5.9 (0.8)	5.2 (1.1)	5.6 (1.0)
Overall	6.1 (0.9)	5.6 (1.2)	5.8 (1.1)

Note: Each factor received 40 responses.

The present study indicates that the first three factors play the most important role for educational innovation. Clearly, student *motivation* is a key factor (Mean=6.1, SD=0.8), while student *attention* is another key factor (Mean=6.1, SD=0.8) and student learning is a third key factor (Mean=6.1, SD=0.7). In this context, motivation may be considered as input, while learning may be regarded more as the output of the participatory activities. Attention may be considered as the binding factor that needs to be managed continuously throughout the course. Classroom *innovation* (i.e. novelty) is not considered a key factor (Mean=5.4), but this result is characterized by high uncertainty (SD=1.7). The majority of the students see a clear relationship between novelty and educational innovation, while a little minority group of students rejects this relationship (n=3). Student *stimulation* is considered only moderately important (Mean=5.6) for educational innovation, which means that the

stimulation of the students in the classroom is not considered as a decisive factor for educational innovation through participatory activities. This is not to say that stimulation is unimportant, but simply that it is not the most important factor. The students agree on this result (SD=1.0). In fact, the national and international students independently reach the same conclusion, which increases the reliability of this result. Figure 1.1 describes that motivation, attention and learning are the most important factors for educational innovation through participatory activities.

4. MOTIVATION, ATTENTION, AND LEARNING ARE THE MOST IMPORTANT FACTORS FOR EDUCATIONAL INNOVATION

Number of responses: 200
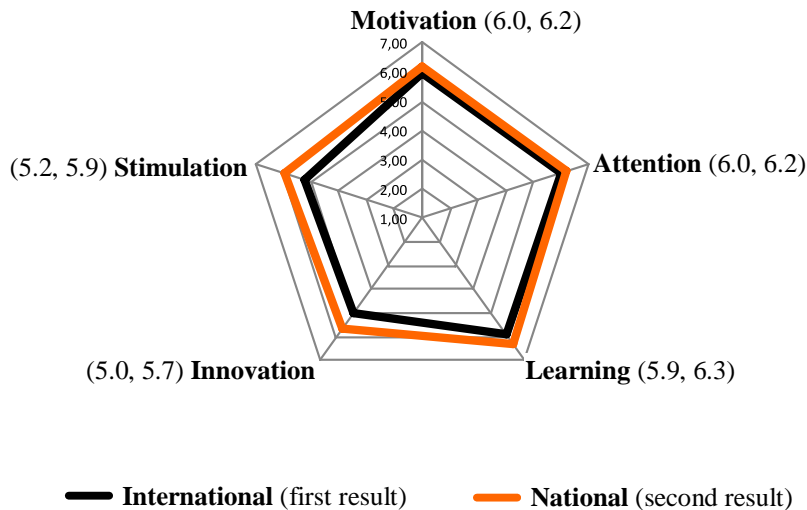
Figure 1.1. Five-factor analysis

Motivation

Motivation is a key concept in the education literature (Pintrich & De Groot, 1990; Newby, 1991; Vallerand et al. 1992; Pintrich, 1994). In this context, instructional strategies, for example the use of the interactive exercises, have been recognized as a key component for maximizing student motivation in business school classrooms (Debnath et al., 2007). The present study confirms that participatory activities are

vital for increasing students' motivation. Specifically, the international students evaluate the importance of this factor by an average of 6.0 out of 7.0, while the national students confirm the importance of using participatory activities to increase the students' motivation by an average of 6.2 out of 7.0.

Attention

Attention has not yet been considered a key component in the education literature, but the results of the survey suggest that its importance is essential. The two classes of students independently confirm that classroom attention is a vital challenge to avoid that the students lose the ability to concentrate. The students indicate that the importance of *student attention* is equally important as student motivation, which was the most surprising result in the survey because the education literature rarely seems to have recognized its importance. The international students recognize a clear relationship between participatory activities and student attention in the classroom by an average of 6.0 out of 7.0, while the national students confirm this result by an average of 6.2 out of 7.0.

Learning

It is widely acknowledged that active learning is a central topic in higher education teaching (Ausina et al., 2013) and that different classroom activities are important for maximizing the students' motivation (Debnath et al, 2007). It is widely recognized that *variety* in educational activities (Lengnick-Hall & Sanders, 1997: Pintrich & De Groot, 1990) and *meaningfulness* of the different assignments play a major role for making the classroom activities relevant (Blumenfel, 1992). Creating relevance of the classroom activities may include a reconsideration of the *students' roles* in the classroom activities (Blumenfel, 1992). These factors obviously play a role for learning, but beyond the course learning objectives remains a latent demand for *compelling, challenging* and *engaging* classroom activities. The present study confirms a clear relationship between participatory activities and student learning in the classroom. The international students rate the importance of participatory activities for accelerating learning by an average of 5.9 out of 7.0, while the national students confirm this result by an average of 6.3 out of 7.0.

Innovation

Innovation in classroom activities (i.e. novelty) is perhaps the most interesting factor, but simply doing something different from tradition teaching activities (i.e. lecturing and presenting cases) is considered the least important factor. Simply having participatory activities is insufficient, *if* the students do not find these activities relevant or meaningful. By innovation is meant non-traditional teaching activities that provide a new or different way of learning. The students were evaluating the degree of innovation of the interactive exercise compared to traditional lectures.

The content of the participatory activity is a key challenge for the course instructor, because if the students do not find the activity relevant then the implementation of new learning technologies may have an adverse effect. However, the relatively low degree of importance does not mean that facilitating innovative classroom activities are unimportant, but the implementation of non-traditional classroom activities only to do things *differently* represents a potentially incomplete idea. The international students evaluated the importance of classroom innovation ('only') by an average of 5.0 out of 7.0, while the national students confirm the relatively low importance of simply implementing non-traditional classroom activities to do things differently by an average of 5.7 out of 7.0.

Stimulation

Stimulation is another important, but not an essential, factor for maximizing the quality of classroom activities. Student stimulation can be achieved through partici-patory classroom activities with the explicit purpose of activating and *challenging* the students in the classroom activities. Many of today's students have great ideas, but may lack the ability to translate them into value, and that is what should be trained in the classroom. The students' indicate that participatory exercises are im-portant for stimulation. For example, the students assumed different roles in the groups and the exercise challenged the students in new ways. Hence, the result suggests that there is a need for a higher amount of interactive exercises compared to what is the common practice in most business schools today. The international students evaluate the importance of this factor by an average of 5.2 out of 7.0, while the national students confirm the high, but not essential, importance of having par-ticipatory activities to stimulate the students by an average of 5.9 out of 7.0.

5. DISCUSSION

The students' attention in the classroom has become an important challenge for university instructors, especially during the past five years. A growing number of today's students are always connected to the internet in parallel to the classroom activities. This can be seen as a new challenge and at the same time a new oppor-tunity. Participatory activities therefore represent an alternative to the massive open online courses (MOOC) that have received much attention recently.

New challenge and opportunity

The evolution of new technologies has led to new opportunities to improve the current teaching at university, but it has also led to an information overload and an attention deficit. Or, as Simon (1971) puts it, a wealth of information has the power to create a poverty of attention. For example, some students use time on facebook, responding messages, writing emails, reviewing online newspapers, and finding other non-related educational information in class. For these students, the classroom

activities are constantly interrupted, which means that a growing number of students are only partially present in the classroom activities. The challenge of 'continuous partial attention' is not a new idea (Stone, 1998), but it is new that students' (full) attention is a key component in university education. James (1890) originally described the term attention as a selection of simultaneous objects, which implies withdrawing from some objects in order to effectively concentrate on other objects. The problem is that an increasing number of students seem to be only *partially attentive* rather than fully attentive in class. The challenge for many university teachers is no longer reduced to the question *if* new learning technologies should be used, but finding new ways of combining traditional teaching methods with participatory classroom exercises. To that end, the experimentation with new teaching methodologies is a double-edged sword: It may help the instructor to improve the current teaching, yet it may also have the adverse effect to decrease the students' motivation if the students do not find the new teaching methodologies relevant or meaningful. A major challenge for the future is therefore to be aware of, and draw attention to, how new learning technologies can be applied in classroom activities to avoid that the students' attention is disrupted by irrelevant parallel activities.

Participatory activities

Traditionally, computer-based activities have been designed as exercises in a computer lab by following a manual with a list of predefined steps, for example in statistics courses, while new and innovative methods have gradually emerged during the past ten years that allow for using web-based surveys that can be answered via the students' mobile phones, tablets or laptops. However, participatory classroom activities are not limited to online tools. The old idea of using participatory activities in class fits well with the new challenge of managing the students' attention in the classroom. In this context, both paper and computer-based participatory activities are important. Paper-based activities remain a valid method, while computer-based surveys in class represent another new opportunity in university teaching to engage the students in the classroom activities. Based on the study, we believe that there is a need to develop the current teaching activities, not by restricting the use of students' information and technologies in the classroom, but rather by connecting them with the present university infrastructure.

4.3 Massive open online courses

The new idea of massive open online courses (MOOC) may be considered innovative, but irrelevant for improving the *quality* of the teaching at university. A MOOC with over 300 students is similar to the classic lectures in plenum with over 100 students, but is remains fundamentally different from the small classes with less than 30 students. The context of massive open online courses to more than 300 students is clearly different from the teaching of fewer than 30 students in a class-

room. The MOOC present a new opportunity for scaling up the number of students in order to lower the cost per student (i.e. cost challenge) and finding new routes to market (i.e. revenue streams). Thus, the MOOC represent an interesting step in terms of 'cost innovation' (Williamson, 2010), but not necessarily for improving the quality of the current academic courses. The MOOC may be considered efficient in gaining *breadth* in order to scale up the number of students to lower the cost per student; and it may work as an effective method to capture the revenues from otherwise inaccessible students, but the obvious limitation of the MOOC is the potential lack of *depth* in order to engage the students in the teaching activities. By depth we refer to improving the quality and relevance of the course material through paper or computer-based exercises in the classroom. The activation of students via interactive online surveys in real-time is possible through a MOOC, but the distance between the teacher and the students remains a critical limitation. A related limitation of a MOOC is that it may be considered only 'partially connected' to the real world. High quality paper-based group exercises are not an option. Neither is the rich dialogue with the students about different topics in the teaching activities an option. Thus, the MOOC are relevant in terms of cost innovation (Williamson, 2010), but they to not solve the new and emerging challenge of the students' partial attention or attention deficit, which may be considered a critical limitation. As an alternative to scaling up the number of students to decrease the cost per student, we encourage our fellow colleagues to incorporate participatory exercises in the teaching activities in order to (*i*) increase the students' motivation, (*ii*) manage students' attention, and (*iii*) accelerate learning.

6. CONCLUSION

The present study presents an original contribution to the education literature by specifying the importance of classroom attention. The present study suggests that both paper and computer-based participatory activities are useful in relation to the new and emerging challenge of managing the students' attention in class. Participatory activities are also important for increasing the students' motivation and accelerating learning. Participatory activities are relevant in order to improve the traditional classroom activities. Not only by facilitating paper-based exercises, but also by integrating the students' devices in the current classroom teaching to avoid that these devices could otherwise consume their attention. The present study indicates an unexploited potential in using real-time online surveys that can be answered via the students' mobile phones, tablets or laptops in the classroom. The present study draws on a total of 320 responses from 40 students from 15 different countries. The small sample size is a critical limitation, but the present study is nevertheless suggested to be a valuable first step for the research on educational innovation through participatory activities. Finally, the five-factor framework is scalable (and perfectly repeatable), which provides a new avenue for conducting further research.

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