LESSON PLANNING AND ORGANISING STRATEGIES FOR MAINTAINING STUDENTS' FOCUS DURING COMPUTER SCIENCE LESSONS

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ABSTRACT

The first part of the research was conducted in November and December of 2020 as described in the author's Term Paper "*LESSON PLANNING AND ORGANISING STRATEGIES FOR MAINTAINING STUDENTS' FOCUS DURING COMPUTER SCIENCE LESSONS IN FORM 4*".

The aim of this Paper is to expand upon the scope of the research, to evaluate and discuss the developed recommendations on how various lesson planning and organising strategies can help to maintain students' focus.

The second part of the empirical study described in this Paper included a questionnaire, an interview with two Computer Science teachers from general education schools and a Computer Science teacher from an international school.

It was found that there are several factors that have an impact on the focus of the students. It was concluded that the teacher must keep up with what the students are interested in, and students must be inspired to learn instead of having to learn mainly because they must achieve certain grades. However, since teachers may face several challenges when it comes to implementing different strategies, cooperation with school leaders, school administration and parents is crucial. From the second part of the study, it was found that it is significant that teachers are not micromanaged, that there is a set curriculum teachers and students can follow. Positive communication and trust in the whole school community is important when it comes setting up students for academic success. Whether teachers can implement different recommendations for keeping the students' focus depends also on outside factors that depend on the school, therefore, it is important for teachers, school leadership, administration, and parents to all work together.

Keywords: Computer Science lessons, extra-curricular programming activity, lesson planning and organising strategies, education system, curriculum

Introduction

All students should be provided with opportunities to achieve academic success. Overall, students learn less if they do not focus during the lesson but keeping the focus of the students can be challenging. Additionally,

the classroom environment and other factors that the teacher cannot control can negatively impact the focus of the students. However, achieving academic success requires focus (McQuown, 2011). Changes in the new educational standard allow schools to teach Computer Science from Form 1, but for the most part Computer Science in Forms 1 to 3 is integrated into other subjects, however, in the academic year of 2020 and 2021 in Form 4 Computer Science was taught as a separate subject for the first time (Skola2030, 2019). There are many reasons why students may struggle to remain focused during the lessons, but there are several recommendations teachers can apply in lessons to keep the focus of the students.

The author of this Paper investigated how various lesson planning and organising strategies can help to maintain students' focus during Computer Science lessons in Form 4 in her University of Latvia Term Paper "*LESSON PLANNING AND ORGANISING STRATEGIES FOR MAINTAINING STUDENTS' FOCUS DURING COMPUTER SCIENCE LESSONS IN FORM 4*" (Holberga, 2021). The Term Paper was presented in the University of Latvia, Students' Council Student Scientific Conference in November of 2021, additionally, the article of the Term Paper is published in the Conference's collection of articles. After the Students' Scientific Conference, the author continued to expand upon the research, to evaluate the usefulness of the recommendations created for her University of Latvia Term Paper. This article aims to evaluate and discuss the created recommendations.

The research method for the Term Paper had included a case study that involved the author's self-evaluation and reflections of her Computer Science lessons and Programming extra-curricular activity, additionally, an interview with a Computer Science and extra-curricular programming teacher was conducted (Holberga, 2021). It was concluded that the environment, available technology, and materials has a huge influence on the quality of teaching and learning (Holberga, 2021). Many different factors that influence whether students will be able to focus during Computer Science lessons, but not all of these factors can be influenced by the teacher (Holberga, 2021). There are many recommendations that a teacher can implement in the lesson, so the students remain focused.

According to the following authors: Oganisjana (2012), Balsons (1996), Dameron (2018), Banks (2014), Gerschler (2012), Voterhauzs (1999), Goundar, (2014), Reeves (2015), Gottschalk (2019), for students to focus during the lesson:

- The teacher must be able to adapt and improvise, as well as be enthusiastic about the subject, know how to use their voice and silence most effectively, use different methods, provide and ask for feedback,
- The material and tasks during the lessons should be interactive, interesting, diverse, and divided into smaller steps,

- The students must be active, motivated and follow the classroom rules, feel safe, as well as be able to connect the new material to what was learnt previously,
- The physical environment must be comfortable, easy to move around in, and set up according to ergonomic guidelines, also, the students should be able to see and hear the teacher.

Undoubtedly, there are many guides and tips on how the teacher can plan and organise the lesson to keep the students focused. However, due to several different factors these recommendations are not always implemented during the lessons or at school. Evaluating the implementation of recommendations is significant because to improve the quality of education one must not only try to implement or create recommendations, but also evaluate the effectiveness of these recommendations, whether the guidelines the author created can be applied to a wider range of teachers and subjects. There are several recommendations and advice on what teachers must do, but it is crucial that these recommendations and advice receive feedback. Therefore, one of the goals of this Paper is to evaluate whether other teachers are able to implement the author's recommendations.

Methodology

The research for this Paper was conducted in December of 2021 and January 2022. Data collection methods included a questionnaire and interviews.

Hence, the questionnaire was sent out to education students, teachers and education students who work as teachers. The questionnaire consisted of three parts. In the first part the respondents were asked basic questions about themselves. In the second part respondents evaluated how often they encountered the challenges listed below. In the third part the respondents evaluated how successfully they were able to implement the recommendations. The aim of the questionnaire was to expand research upon the challenges that teachers face when it comes to keeping the students focused and to evaluate whether teachers can implement the recommendations on how to keep the students focused during the lessons.

Firstly, the respondents had to tick whether they are studying in one of the teacher study programmes, working as a teacher or both. The respondents had to check their age group: 18–25 years, 25–29 years, 30–39 years, 40–49 years, 50–59 years, 60 years and more. Additionally, the respondents chose which subjects they are studying to teach or teach at a school: Latvian, English, Maths, Psychology, Design and technology, Art, Music, Biology, Chemistry, Physics, Geography, Physical Education, Health studies, Culturology, Social studies, History or other. Also, which classes

the respondent teach and their work experience (if applicable). The author took into consideration the basic information about the respondents when analysing their answers.

Moreover, the respondents had to evaluate how often they have encountered the listed problems during lessons or how often they think teachers encounter these problems. The respondents evaluated the statements on a Likert scale of 4 to 1, 4 meaning "nearly in every lesson" and 1 meaning "never". The statements were based on problems that the author and the interviewee from the first part of the study encountered when teaching. The aim was to determine how common are these challenges:

1. the tiring of vocal cords,
2. lack of learning material,
3. the physical environment of the classroom does not follow ergonomic guidelines,
4. there is not enough time to receive feedback from the students about the lesson during the lesson,
5. explaining instructions to students individually takes up a lot of time,
6. the students do not take the teacher seriously because the teacher is young,
7. the students do not follow behaviour rules during the lessons,
8. a lack of technology or technical support in the classroom,
9. not enough time to teach all the mandatory content (Holberga, 2021).

Additionally, respondents could write down any other challenges that they had encountered. The challenges respondents had to evaluate were based on challenges faced by the author and interviewee from the first part of the research, the aim of the questionnaire was to investigate how common are these problems amongst other Computer Science teachers and teachers of other subjects.

Furthermore, the respondents had to evaluate whether they are able to implement these recommendations into their lessons or do they think that teachers are able to implement these recommendations. The respondents evaluated the statements on a Likert scale of 4 to 1, 4 meaning "implemented in nearly every lesson" and 1 meaning "fail to implement". The respondents evaluated whether they are able to or whether they think teachers are able to:

1. stay up to date with the interests of the students and adapt the learning material to the students' interests,
2. at the beginning of the semester explain the classroom rules, behaviour rules to the students and stick to them,
3. explain the instructions to the students at the beginning of the lesson before students start working,

4. teach students time-management skills,
5. use a "motivation system" such as giving points to students and then rewarding them accordingly to the points,
6. using the voice effectively to avoid the tiring of vocal cords,
7. include elements of gamification such as points, competition in the learning process (Holberga 2021).

Also, the respondents could write down any other recommendations that they implement during the lessons and were thanked for completing the questionnaire. The recommendations the respondents had to evaluate were based on the research the author had done for her Term Paper "*LESSON PLANNING AND ORGANISING STRATEGIES FOR MAINTAINING STUDENTS' FOCUS DURING COMPUTER SCIENCE LESSONS IN FORM 4*". The aim was to acquire feedback on the recommendations.

The interviews were conducted in January 2022. The aim was to learn about the teachers' experience at school, how teachers are supported and deal with challenges. Additionally, the author aimed to discuss previous findings and to learn what support teachers need overall, when encountering the challenges rated as the most common in the questionnaire. Also, the interviews aimed to gather feedback on the rating of the recommendations. The interviewees included two general education Computer Science school teachers and one Computer Science teacher from an international school.

Overall, the interviewees were asked:
1. what forms and subjects they teach,
2. for how long they have worked as teachers,
3. what challenges they have faced during lessons,
4. how they manage to overcome these challenges,
5. for recommendations on the challenges that teachers encountered the most often based on the questionnaire.

The author discussed the ratings of challenges and recommendations from the questionnaire to receive further feedback from Computer Science teachers with different teaching experiences.

Results

The questionnaire was completed by 55 respondents. 40% of the respondents work as teachers, 26% are studying to become teachers, 34% study and work as teachers.

For all the challenges and recommendations, the author coded the answers from 1 to 4, and calculated the average rating. Those who work as teachers rated that the most common problems that they encounter as: the tiring of vocal cords (2.77), a lack of time to receive feedback from the students about the lesson (2.73), and individually explaining instructions

to students taking up a lot of time (2.73). Those who study and work as teachers rated the tiring of vocal cords (2.9) and the students not taking the teacher seriously because the teacher is young (2.7) the highest. With an average of 2.63 were rated the classroom not being set up according to ergonomic guidelines, and a lack of time to receive feedback from the students about the lesson. However, those who were only studying as teachers rated that they think individually explaining instructions to students takes up a lot of time (3.07), but with a 3.0 the following was rated: the tiring of vocal cords, the classroom not being set up according to ergonomic guidelines and a lack of time to receive feedback from the students about the lesson. A few respondents listed other challenges such as: a lack of technology, lack of positive cooperation with parents, students taking time off from school due to COVID-19.

Those who work as teachers rated that teaching students time management skills (2.1) and using a "motivation system" (1.7) were implemented the least during lessons, but using the voice effectively (2.77) and explaining instructions to all of the students at the beginning of the lesson (3.05) were implemented the most often. Those who study and work as teachers rated effectively using the voice (2.2) as being implemented the least, but at the beginning of the semester explaining the classroom rules and sticking to them (3.1) was rated as being implemented the most often. Those who study as teachers rated that they think teachers are usually able to at the beginning of the semester explaining the classroom rules and stick to them (2.57), and to explain instructions to all the students at the beginning of the lesson (2.43). However, teachers usually struggle to teach students time management skills (1.86) and effectively use their voice (1.93).

A few participants listed other recommendations not mentioned in the questionnaire such as: having students help lead the lessons, using humour, making lessons fun, differentiating activities.

Nevertheless, it is also important to look at the differences in ratings between the education students, teachers and education students who also work as teachers. Figure number 1 shows the differences between how the ratings of the encountered challenges differ. The challenge numbers correspond with the numbered challenges described in Methodology.

The values 1.0 until 3.5 were chosen for the graph to clearly illustrate the differences. Due to falling in the middle and crossing the other lines, the yellow line showing the rating of students who are also teachers does not have numerical values for each point. The biggest difference is between how the groups rated the 6th challenge in the questionnaire – the students not taking the teacher seriously due to the teacher possibly being young. Overall, this is a challenge encountered by young teachers. The students rated explaining instructions to students individually as the greatest

challenge, while teachers and education students who work as teachers rated the tiring of vocal cords as the one they encounter the most.
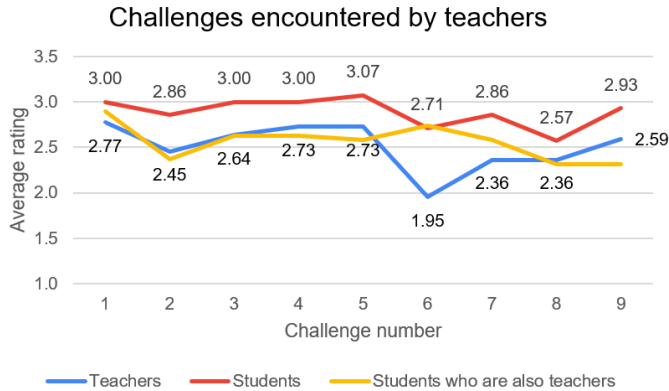

Figure 1. Challenges encountered by teachers

Moreover, a few differences can be seen when comparing the evaluation of recommendation implementations in Figure 2. The recommendation numbers correspond with the numbered challenges described in Methodology.
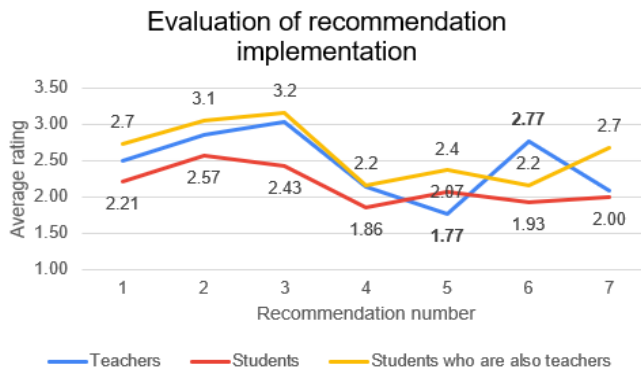

Figure 2. Evaluation of recommendation implementation

Also, the values 1.0 until 3.5 were chosen to clearly illustrate the differences. Due to falling in the middle and crossing the other lines, the blue line showing the rating of teachers does not have all numerical values attached. Overall, students rated that they think that teachers less often

can implement these recommendations. Teachers rated that they nearly never use a motivation system (1.77), while students who are also teachers and education students rated this recommendation higher. Students who are also teachers rated that they nearly always are able to explain the instructions to the students before they start work (3.2).

Also, the author interviewed three Computer Science teachers. The aim of the interviews was to learn about the teachers' experience at school, how teachers are supported and deal with challenges. Since there are several factors that a teacher cannot control, support is crucial.

Firstly, Teacher X was interviewed, the aim is to learn about the teacher's experience at an international school, how teachers are supported and deal with challenges at an international school. Teacher X had taught maths for 7 years in the United States, but at the time of the interview had been teaching Computer Science for the International General Certificate of Secondary Education (IGCSE) in forms 9 and 10, and the International Baccalaureate (IB) in forms 11 and 12 at an international school for one year. The teacher stated that the main difference is that IGCSE and the IB programme are each a two-year curriculum where everything is planned. Computer science is diverse, one must be knowledgeable in those fields to teach them. The respondent explained that at the international school students bring their own devices, but back in the States the computers were provided by the school due to being in a low-income area and were admin locked. Due to being a Computer Science teacher the respondent had to also teach Maths. When asked what challenges the respondent has encountered when teaching Computer Science, the respondent explained that during distance learning due to COVID-19 some colleagues struggled due to a lack of digital skills. Teacher X faced challenges while teaching programming – how to teach it online and how to make it easier and interesting for students. When asked "What new challenges do you think teachers face now due to the COVID-19 pandemic?", the teacher stated that when one is used to teaching in a room in person one must get used to teaching online, but Computer Science can be taught online as well. The teacher must understand the students, link the learning material to the interests of the students.

Also, the author asked: "From my questionnaire it can be concluded that very common challenges include: the tiring of vocal cords, not having enough time to ask for feedback from the students for the lessons, explaining instructions individually to students takes a lot of time." Teacher X commented that it is hard to motivate the students, but one must remember that a lesson is not a lecture, students need to interact with each other, students can also be teachers, explain in their own way. The author inquired: "There are several things that teachers can do such as explain the

classroom rules to students, explain instructions at the very beginning, but what do you think prevents teachers from applying the recommendations in the classroom? What hinders the teacher's ability to deal with different challenges and problems in the classroom? Do you manage to apply all the tips and tricks that you have been taught?" It must be noted that the international school has small classes, the smallest having 4 students and the biggest having 13 students, the students are more motivated and get to choose classes, are not pushed to be there. The teacher must learn from others, if the teacher does not have time for feedback the teacher still must be observant to figure out what works better during the lessons. Unfortunately, due to be used to playing video games students do not read instructions. Google Classroom can be used, it is structured and easy to read. It is beneficial for the teacher to have a routine. The respondent commented that students who come from lower socioeconomic backgrounds experience more stress. Overall, the respondent explained that there are outside factors that prevent the teacher from implementing different recommendations in the classroom.

Additionally, the author questioned: "How can the school director, administration support teachers? How can the parents of the students support teachers?" Teacher X stated that in the international school parents have a lot of influence, have the support of the people in the charge, trust the teacher, when the teacher need help, they can ask. Also, the teachers are not micromanaged, the school leadership realize that the teacher has experience so he or she knows what should be done. Also, short classes and short breaks are helpful for the teacher to get everything ready. The situation at the international school is unique – the motivated students are the majority.

The author wished to learn: "From my questionnaire there are things that teachers might not manage to do – teach students time management skills, give points to motivate students. Do you manage to do this in your lessons?". The teacher responded that having the course structured is helpful. This also helps students develop time-management skills as the course structure has all the dates on there, IB has an internal assessment, the teacher must tell the students due dates and give time to work on it. It is also important for students to be reminded of deadlines. Unfortunately, grading papers takes up a lot of time. The respondent commented that Maths and Computer Science are both systems, but systems can be taught like games.

The aim of the interview with Teacher Y and Teacher Z was to understand the challenges teachers face and what support is needed. Both teachers were interviewed together due to them being married. Both teachers work at general education schools. Teacher Y teaches forms 7,8 and 10, has led

an extra-curricular activity for two years and worked at a school for 6. Teacher Z teaches Computer Science to forms 4 through 8 and form 11, was a substitute teacher for a year and has been teaching for three years. Teacher Y stated that they encountered the following challenges: students struggling to follow classroom rules and safety rules for the COVID-19 pandemic. Teachers may struggle to prepare if suddenly their class must be taught online. The interviewees commented that they feel like male teachers are respected more in the classroom. The interviewees advise teachers to remain calm when encountering different challenges.

Moreover, when the author asked about what challenges in their opinion teachers faced due to the COVID-19 pandemic the interviewees agreed that it was getting students to follow COVID-19 safety guidelines. The author asked: "How can the school's leadership and administration support teachers?" Teacher Y answered that the colleagues who were trusted, were the easiest to turn to. Trust between colleagues is very important. The management had made it mandatory to fill in a questionnaire about possible improvements, what support they need. Teacher Z commented that the administration acknowledging and providing positive feedback for the teacher is helpful.

Additionally, it was inquired: "How can the parents of the students support the teachers? How can parents be motivated to support teachers?". Teacher Z stated that the teachers should not be micromanaged and as professionals be left to do their job. The parents providing positive feedback is also important. Teacher Y shared that is important to communicate with the parents so there are no misunderstandings. If the parents of the class are able to talk, they can talk to each other and to the teacher, if the parent is calm about the school environment, then the relationship with the parents is better. For example, when there were parents' evenings, teachers sat in the school, unfortunately it was unpaid time, but on the other hand this was the opportunity to come talk with the teachers for the parents. Lack of positive communication is an issue.

Furthermore, the author also asked: "There is several suggestions that teachers can follow to motivate students to focus on their lessons, which do you think are preventing teachers from implementing recommendations to keep their attention in their lessons? From the author's questionnaire things that teachers do not manage to do – teach students time management skills, give points to motivate students. Do you manage to do this in your lessons? How can students be taught time management skills and be motivated?". Teacher Y shared that it is a lot of work. Teacher Z commented that the teacher must create the specific requirements, divide the points and allow students to start with the easiest. If the teacher will be calm and remind the students, they will also be able to complete everything. Students

must be aware of the course requirements and deadlines. To overcome the strain of vocal cords the teacher can for example clap her hands until students pay attention. Students will follow the classroom rules if they respect the teacher, otherwise it is difficult for students to act appropriately in the lesson if for example they misbehaved in the previous one. Teacher Z recommends if students write, they do not speak, they make notes in the computer to remember something they write down, for example, they describe the drawing tools in the program, etc. If needed the teacher can use a microphone. Teacher Z stated that the first year was difficult because he experienced voice strain. The teacher must take breaks – use free time in-between lessons to rest. Perhaps, a legally paid rest day or bonus would help the teachers not burn out.

Discussion

Seemingly the results depend on the individual situation of the teacher – the subject they teach, their teaching experience, the school environment itself. Overall, it is important to consider the comparison of the answers provided by those who work at school and those who do not, as recommendations are not always developed by those who work at school. There could be several reasons why the ratings differ in the questionnaire. It is possible that a part of the respondents has not attempted to implement the recommendations in the lessons. Whether the teacher is taken seriously by the students seemingly does not only depend on their age. Perhaps, smaller groups of students are easier to manage. From the questionnaire and interview it can be concluded that those who do not work at schools, do not assume that the straining of the vocal cords is a prevalent challenge faced by not only new teachers. Perhaps, students who are also teachers, rated that they are able to explain instructions nearly always at the beginning of the lesson due to their time management skills. Possibly, younger teachers and education students attempt to implement and assume teachers implement a motivation system, because using a motivation system may require elements of gamification which is relatively new. The way the students rated the recommendations were perhaps based on their own experience at school and perception of teaching. It is also important to investigate the assumptions of those who do not work at school, to discover the differences between perception, opinion, and reality. When creating recommendations, it is significant that the opinion and experience of teachers is taken into consideration.

Due to the interviews taking place in 2021 and 2022 several challenges teachers faced were related to COVID-19. The interviewees mentioned that a lack positive communication between the parents and teachers can lead

to problems. Also, the teacher should not be micromanaged. This could lead to stress for the teacher and other negative feelings, which in turn could negatively impact their work. All interviewees also stated the importance of a set curriculum, deadlines and that it is important to remind the students of these deadlines. The interviews highlight the different effects different school systems and policies have. The type of school can determine which recommendations teachers are able to implement in their lessons. Teachers who teach small classes or groups may encounter less challenges than those who teach bigger classes. However, in some subjects even though the class usually is split in two, due to a lack of teachers this is not always possible. Teachers may struggle to overcome challenges due to the number of students in the classroom. Also, teachers may experience more voice strain if there are more students in the class. It is important for the teachers to understand their students and remember that a lesson is not the same as a lecture. Since there is not always enough time to receive feedback, it is important that the teacher is observant of how the students are feeling and acting in the lesson. However, there are also factors that the teacher does not really control. Having a set curriculum will allow the teacher to manage and plan their time, which in turn will also help students develop time management skills. Having small classes allows the teacher to pay more attention to each student.

Overall, the results of the questionnaire and interviews show that there are common challenges that teachers face and similar reasons why different recommendations might not be implemented, but not all of them can be impacted by the teacher. That is why it is crucial that the school leadership and administration investigate the problems teachers encounter and how can teachers be supported.

Conclusion

From the second part of the study, it can be concluded that it is crucial that school leadership, administration and parents support teachers. The school administration and leadership must show interest in what the teacher is doing and show appreciation for the teachers' work. Positive communication is very important. The teacher should not be micromanaged by the school or parents. The parents should trust the teacher. There should be a planned-out curriculum with clear deadlines and criteria. Additionally, teachers must learn and use different strategies to rest one's voice during lessons. Having a set curriculum and small classes alleviates the workload teacher must do outside the classroom. The teacher must understand the students' needs and wants and be observant. Also, the school's leadership and administration must make the teacher feel

appreciated. Positive communication in the workplace and with parents is also crucial, the teacher should be able to ask for help. Also, parents should trust the teacher. For the school leadership, administration, and parents it is important to not micromanage the teacher. From both parts of the study, it can be concluded that the school as a community should focus on building trust not only between the students and teacher, but also between the teachers and parents, and school administration to ensure the quality of education students receive.

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