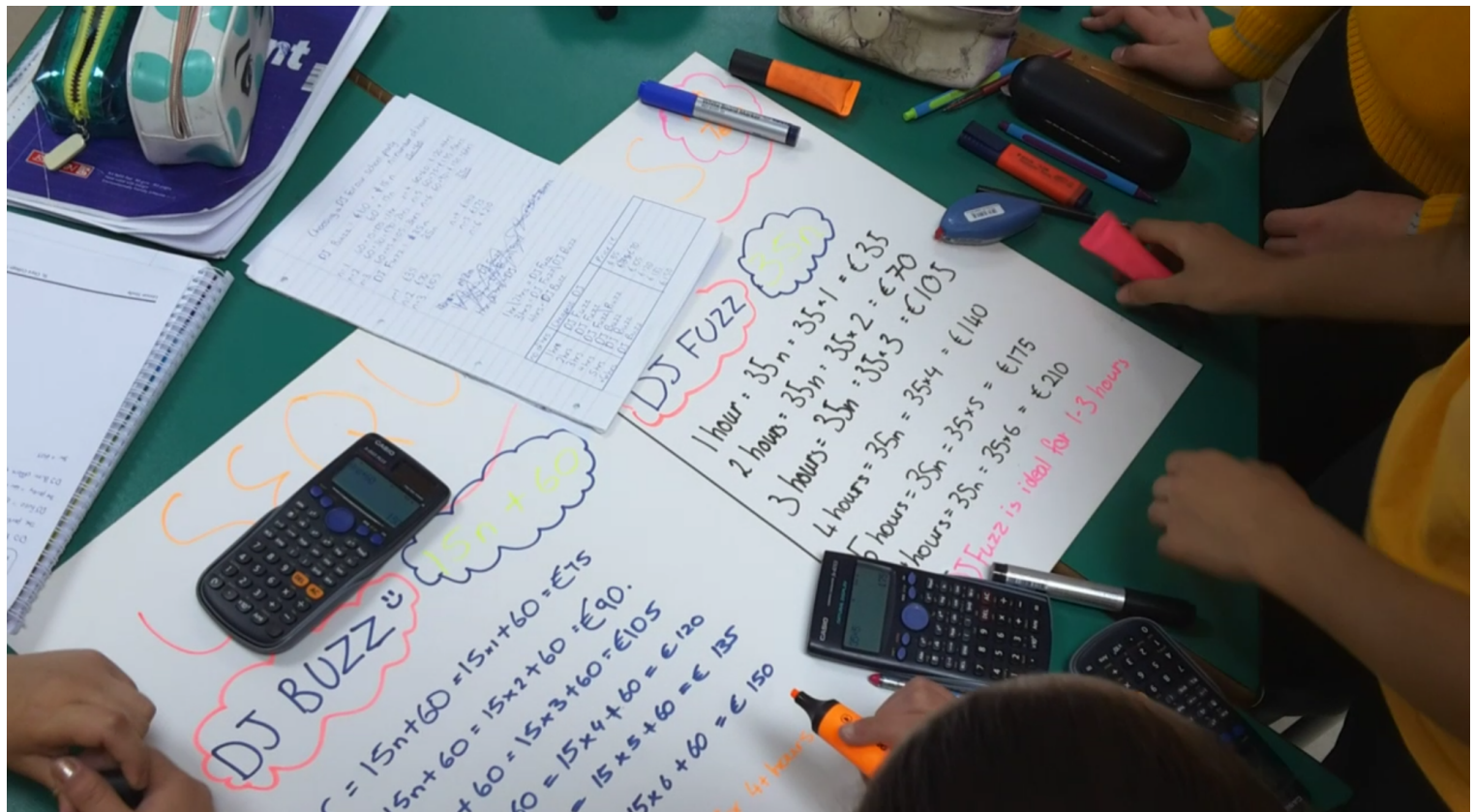


LESSON STUDY REPORT



MAKING MATHEMATICAL CONNECTIONS

Report compiled and written by:

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3rd July 2017

STUDENTS' EXPERIENCES

Following each lesson trial, students were asked to write about their experience, what they liked, felt uncomfortable doing and to provide suggestions about things that they would change. All students reported enjoying the lesson study experience. Most of them identified working in groups as something that they liked and enjoyed doing. Below are some of the most common comments.

What I liked about the lesson...

We could give our own opinions
That we worked in groups
The DJ problem was interesting
It was an extra activity and we had fun
The group work allowed us to share ideas and respond to criticism
The lesson was interactive, the teacher wasn't the only one speaking
We all got along well together
The teacher did not tell us what topic he expected us to work out with
The lesson was interactive and we expressed our ideas
We worked as a team and shared our ideas

What I felt uncomfortable with during the lesson...

The camera/filming
We didn't have a lot of time to work out the problem
There were too many people staring at us
We had to go out in front of other students to explain what we did
Lack of explanation before we worked out the problem

Further comments...

I would like to have more group work during the Maths lessons and more Maths activities like these
It was fun and a creative experience
It was a different type of lesson

Three typical student writings about their experience

"I like the way the lesson was organised and how it was taught. I learnt how the different topics can all be used to solve a single problem. I found this lesson more interesting than the usual ones."

"The lesson was fun and I liked it since we worked more in a group. However, I felt pressured since there were a lot of people whom I didn't know and they were observing our work. I learnt that all the topics in Maths add up together and a problem can be solved in different ways."

"This lesson was very nice because of the group work. I learnt that one problem can be solved with a lot of methods."

TEACHERS' REFLECTIONS

Teachers involved provided the following reflections about their participation.

It was a very positive experience, something voluntary and not imposed on us. It was something new, something that I had never experienced before. I had the opportunity to be part of a team that spent some time preparing a special lesson. I had the opportunity to learn a lot from this activity: enriching my pedagogy and mathematical content, and enhancing my communication and collaboration skills. At first I had a lot of worries, such as: where are we going to start from, what does lesson study entail, what is expected of us, and will we be able to reach our targets. But in the end, as a team, we produced something created by all of us; something that belongs to all of us.

Stefan Azzopardi

This lesson study was a very positive experience, beneficial for my professional development as a teacher. Collaborating with other teachers and actually observing teachers teach inspired motivation to try out different techniques and encouraged me to reflect on my own practice as well as think of ways to improve. Planning a lesson together allowed us to deal with a topic that was difficult for us to teach and plan it in an efficient and effective manner. Doing the lesson twice allowed us to reflect on and improve the lesson. I believe this lesson study was truly successful. But, it required a lot of planning time, and I would not have been able to plan this on my own. Since we were a big group, it was not always easy to agree on an approach. However, each teacher's varied ideas and experiences were beneficial to learn from and create a better lesson. My question is: "How can teachers engage in such collaborative practice on a more regular basis?"

Mariette Bartolo

This was a new experience in teaching for me as I got to work hand in hand with many colleagues on a short school project which focused on improving student learning. I had the opportunity to build and develop ideas and receive immediate feedback on the work. I feel that the lesson study was a success not only for the students who took part in it but also for the mathematics team that helped to create such an amazing lesson. It was difficult to put up all the ideas in such a short amount of time but the work we put together will surely help many students as we can make use of several aspects of that lesson and incorporate them into our usual lessons.

Ian Buttigieg

Overall this was a more positive experience than I expected. We broke the lesson down into a lot of detail and analysed each part carefully. Then we did the same after the first trial. It really reminded me of the importance of self-evaluation and how I don't find enough time and make enough effort to do it. One of the biggest challenges for me was timing and how I did not think we could fit everything into one lesson without it feeling rushed and confusing. However, especially by trial 2, we managed to time it perfectly in such a way that the students still got the full learning experience. I think it was one of the most important achievements that would not have been successful if we had not evaluated the first trial and had a second go.

Tamara Azzopardi

This was my second Lesson Study experience. A difference I found was with the fact that during discussion meetings we had observers who gave us their opinions and insights depending on their area of expertise; being mathematics, pedagogy or methodology. During meetings, we had the opportunity to discuss the teaching of mathematics with our colleagues, something which we rarely have time for in our busy schedules. What struck me was how engaged the students were in the lesson and how they enjoyed it while learning about important higher order mathematical connections. As a developmental teaching milestone, this lesson study made me aware of the need of incorporating more structured pair and group work in my lessons while also encouraging students to present their work in front of other students to help them improve in their public speaking skills.

Gabriella Delia Cumbo

This was the first time that I had the opportunity to collaborate with other mathematics teachers and I must say that it was a learning experience for me. Looking back, I see that working together as a team, works to our benefit since different perspectives, ideas and teachers' characteristics are brought together and challenged so as to come up with an ideal lesson. Moreover, the decision of doing a lesson about a mathematical concept that students find it hard to understand helped me think more deeply about the topic, about how students reason out and even how to apply it. Connecting different mathematical concepts together to represent solutions to just one problem was easier to plan with teachers working together rather than planning it on your own. Timing was a challenge since we were a large group of teachers, each one of us with a different idea brought at the table to be discussed. Yet, I must say that evaluating the lesson after the first trial was helpful to make improvements to the lesson.

Jessica Bajada

Being the first lesson study I was actively involved in, I believe it was one of the most positive experiences in my teaching career so far. I had the opportunity to work collaboratively with other professional teachers, something that unfortunately does not occur frequently. Sharing and listening of ideas, from both experienced teachers and newly qualified ones with innovative ideas, inevitably changed my teaching practices and perspectives. I realised that my teaching ideas, lesson plans and methods do not always transform themselves in the best learning experiences for my students. Therefore, the discussions held with other professionals during the lesson study, gave me the chance to enhance my overall teaching pedagogy.

Such study requires hours of planning and discussions. Conducting eight meetings and other discussion time on social media to complete the plan of one lesson is quite time consuming. Having said this, I still believe that the overall benefits of the lesson study exceeds its disadvantages and challenges. We managed to form a strong relationship between the mathematics teacher community, in which we managed to grow professionally as teachers in the attempt to give a better learning experience to our students.

Philip Zammit

OBSERVERS' COMMENTS

Observers were asked to provide their views with regards to lesson study as a professional development experience for teachers.

I had the pleasure to observe two lesson study meetings which included a preparatory meeting and an evaluation of the first trial lesson. It was very encouraging to observe a group of teachers who are willing to commit themselves to improving their practices towards the benefit of their students' understanding. During these sessions, I observed teachers working in a collaborative environment where they shared their knowledge, expertise and experiences. Although lesson study is a lengthy process, it enabled the teachers to gradually develop a critical eye towards the development and delivery of their own lessons. This critical approach was evident in the issues raised during the evaluation discussion that followed the first trial. Through lesson study these mathematics teachers have managed to create a community that is contributing to their own professional growth.

Miriam Bugeja

Education Officer Mathematics Secondary
Ministry for Education and Employment

It was indeed a pleasure to be part of this lesson study exercise. I do not often have the opportunity, and the luxury, to observe a group of teachers working on a very specific task and then enact it. This micro analysis approach helped me to understand particular aspects of the teaching and learning involved in classroom setting, but also the way these teachers worked, as a team, to develop their expertise, share their craft and question each other's practices. I believe that we all learnt from this experience - the students benefitted from a meticulously planned lesson, the teachers increased their knowledge and became more confident in their ideas and strategies, and the observers gained very enriching insights of what goes on in a teacher's mind when planning a lesson, and then delivering it. I highly recommend this exercise to other groups of teachers as I believe it is a very valid form of professional learning.

Michelle Attard Tonna

Department of Leadership for Learning and Innovation
Faculty of Education

It was a pleasure assisting a lesson study and seeing it work in action. The teachers involved were very enthusiastic and professional in their contributions to design an appealing lesson to the students. Having professionals plan a lesson together, jointly observing the teaching and learning taking place and coming back together to discuss its effectiveness, tells a lot on how quality lessons should be developed. On the flip side of things, I believe that, unless there is a well-planned structure for collaborative preparation to take place within schools, such an approach will be difficult to take off and be sustainable. Lesson study offers an innovative way of planning and delivering a lesson. Yet, it necessitates the development of quality schools; schools that embrace the will to share ideas and resources, to discuss and do research and to revisit the curriculum in offering students what they really need to learn.

Mario Testa

Department of Leadership for Learning and Innovation
Faculty of Education

My experience with lesson study has been most positive. I saw teachers collaborating in a most empowering and fruitful way. Not only were they able to identify something to work on, but they were also able to plan a lesson that by and large addresses the concerns that they had previously identified. Another notable thing I noted was how these teachers, contrary to what normally happens, were able to act as professionals in front of a selection of people who attended their meetings and the two trials of the designed lesson. This is most refreshing as it represents teachers as knowledgeable professionals who can act as a community to plan, implement and evaluate. This experience has served to give us an idea how teachers can take CPD into their own hands and develop professionally as a result. This experience has convinced me that it is also important that we take elements of lesson study and consider ways how this can be used with ITE students.

Michael Buhagiar

Department of Mathematics and Science Education
Faculty of Education

As I see it lesson study research has two main aims: the researching, planning, teaching, observing, evaluating and refining of a lesson or group of lessons that can serve as examples of good practice to others, and, the building of a school-based community of practice that promotes collaboration, discussion, reflection and the sharing of ideas and resources. From what I saw in my two visits to Pembroke Secondary School both of these aims are being achieved. Although both aims are important, for me, it is the latter which takes precedence because having teachers working as a team will invariably have a positive effect not only on their effectiveness in the classroom but also on their overall professional development and their job satisfaction. It can also serve to reduce teacher stress. It is clear that a true community of practice is slowly being built up at Pembroke Secondary school and, hopefully, this can be carefully encouraged and nurtured in the years to come. The dissemination of the products of this research – lesson plan, accompanying video and short paper – to other schools should be pursued with vigor and tact as it can encourage teachers in those schools to team together and do something similar.

Leonard Bezzina

Department of Mathematics and Science Education
Faculty of Education

SOME FINAL REFLECTIONS

As a leader and facilitator of this lesson study group, this was an exciting journey and a positive learning experience for me too. Those reading this report, and keen to start a lesson study group, may benefit from the guidelines I share with you below.

Initiating and sustaining lesson study requires, I believe, fundamental conditions. Primarily, lesson study requires a small group, between three to six teachers, who are willing to work and learn together. Working together necessitates a non-threatening and non-judgmental environment that supports teachers to speak freely about concerns, challenges and dilemmas in their teaching. Professional learning communities flourish when teachers feel safe to share ideas and, as a result, take responsibility and assume ownership over their personal and group learning.

The person leading and facilitating discussions plays a crucial role as well. The facilitator's role is to probe and prompt teachers to think and reflect, by challenging views and insights through purposeful questioning. The facilitator must ensure that all members of the community have opportunities to participate in the group discussions. Having said that, some teachers may take a more leading role than others. There is nothing wrong with this. However, it is important that all members of the community are involved. Teachers should not be told what and how to do things; they are treated as experts, as researchers and as decisions makers.

Collaborative planning is a long process. To engage in lesson study, teachers need to be provided with time to meet on a regular basis. Professional development leaders and providers need to make and plan time for collaboration. SMTs need to seek support from the Directorate of Learning and Assessment Programmes (MEDE) so that teachers are provided with adequate time to meet, share and plan high-quality lessons together. But SMTs also need to get actively involved in lesson study. It is through their active engagement – attending teacher meetings and acting as observers in lesson studies – that SMTs may be in a better position to appreciate the benefits that lesson study offers towards creating and cultivating a collaborative culture. Collaboration is vital and a life-line for schools in supporting the continuing professional development and learning of our teachers and, more importantly, towards improving student learning.

Making connections is what life is all about. This lesson study sheds light upon the advantages of shifting from isolation towards active teacher collaboration. Collaboration, as practised by these teachers, involves the sharing of expertise and experience, whilst reflecting upon what constitutes deep learning. Such projects provide further proof of the ability of teachers to create knowledge whilst enhancing their own professional development. All educators who are innovative and who work to achieve higher goals should be acknowledged and rewarded for their professional attainment.

GAETANO BUGEJA

Director Learning and Assessment Programmes, MEDE

Creating partnerships with schools, collaborating with teachers as well as acknowledging and valuing their expertise are a priority for the Faculty of Education. This lesson study provides insights into how an initiative taken by James Calleja reaches out to teachers in schools and takes on a process which is beneficial to all those involved, especially learners. Furthermore, this professional learning process represents an example to be followed in other subject areas and within other institutions. This is a practical example of how a learning community is formed and of how one can make the most of all resources at one's disposal. It augurs well for the future and shows how the Faculty and teachers can indeed support one another.

SANDRO CARUANA

Dean and Head of the Department of Languages and Humanities Education, University of Malta

Here we have a clear example of how CPD can lead to school improvement. James and his collaborators experience collegiality, programme integration, a developmental approach, data-based development and relevant learning activities. Two fundamental principles behind this initiative are strong leadership and support on the one hand, and that educators embarking in this exciting and fruitful experience believe that professional learning is a way of life. I encourage the reader to focus on what these educators have done to 'elevate the essentials' for improving students learning and get engaged in similar learning experiences.

CHRISTOPHER BEZZINA

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