vidumath

Creative Video for Mathematics Education

Case Studies

English version

Erasmus+

The project vidumath has been funded with support from the European Commission.

Introduction

vidumath is a European project that contributes to mathematics learning through student-generated content in the form of videos, tying into the media use of today's children. In this collection of case studies, we report on teaching experiments we have conducted during the course of the project in Bulgaria, Germany, Norway and Portugal with children mostly aged nine to twelve.

Each case study is written by one or two of the project partners and examines one specific aspect of the project. We describe how this aspect was put into action in a given setting and what we observed and learned from that experiment. In total, this document contains six such case studies from the vidumath partners indicated:

We, the vidumath team, hope that this collection provides a realistic and practical view on how to employ student-generated video in mathematics and potentially other subjects. We would be happy to learn about *your* experiences, too. For more, see our vidumath website http://vidumath.eu.

Many greetings from the vidumath team!

Case Study 1: Autonomous learning and vidumath in class

This case study shows how the project vidumath helps students to develop autonomous learning stimulated and promoted by the use of digital technologies.

A group of pupils from the 32nd Secondary School 'St Kliment Ohridksi', Sofia, work on their own to create a short video on a given mathematical task: equations. The video technique they use is stop motion.

Context

Autonomous learning is an innovative approach that heightens responsibility for learning. Students themselves need to be able to determine what they want to learn, how to get better results, and to seek ways to increase their knowledge and skills. Teachers should help learners to cope with difficulties, so that they can reach a conclusion or decision themselves. The main advantage of autonomous learning is that students are at the centre of the learning process: Students can be an active part, i. e., realize their needs and goals. They are also able to plan, monitor and evaluate their own learning. The defining characteristics of autonomous learning are:

- Students work in groups.
- They take an active part in the learning process.
- Students decide on their own what to learn and in which way.
- They are encouraged to make self-assessments and predictions about their learning.
- They are highly motivated to achieve goals they have set themselves.
- They decide who to work with and how.
- Students look for and find the techniques and methods that will be employed.

Any practice that allows students to take greater control over any aspect of their learning can be considered as a means of stimulating autonomy. The project vidumath was presented in the 32nd Secondary School ‘St Kliment Ohridksi’, Sofia, Bulgaria in October 2015. Four primary teachers and about one hundred pupils aged 9–11 took part.

Introducing teachers and students to the goals, tasks, and project work went through several stages.

Stage 1: At the beginning of October, the teachers were introduced to the objectives and tasks of the project in two school lessons. With the help of a professional filmmaker, the steps that should be taken to create a short video on a math problem were explained. They were told that they would have to make a short video film.

Stage 2: The students were shown short video films in one school lesson. They got acquainted with the tasks of the project: to create a short video (individually or in groups) that expressed an equation, a geometric figure or a symmetry. This took almost one school lesson as well. Mathematics teachers showed their students how to take pictures and use Windows Movie Maker – one lesson. The students brought in smartphones and cameras. With the help of the teacher they learnt about the production of stop motion films – two lessons. At the end of the school lesson the pupils were asked to make a short video about 'symmetry' or 'mathematical equality'. The term 'symmetry' was defined.

Some of the students made short video films at home with the help of their parents (about 30 children). The other pupils were divided into groups, invented ideas and a plot and took pictures with the help of their mathematics teacher. They used cameras, smartphones and Windows Movie Maker in class.

Case

Autonomous learning involves the idea that teachers should be present in the learning process in such a way that students can come to their own decisions and conclusions. The project vidumath provides such opportunities. The pupils themselves offer ideas, search for solutions, and choose the technical devices they will work with such as smartphones, tablets and computers.

With the help of the teacher, who only gave instructions, they made over 80 video films in a short time, which took them less than a month. The students had a great time, talked about the videos, showed them and still follow their YouTube ratings.

The principles of symmetry and mathematical equality were discovered through the method of autonomous learning: The students worked in groups and on their own, invented ideas by themselves and sought ways to solve the tasks.

Approach and implementation

The project began with a highly interactive one-lesson activity with 100 pupils from four classes.

The pupils were divided into groups on friendly terms. These groups worked with little help from the teacher and assistance for the mathematical tasks as well as the technology they used. They decided for themselves which of the suggested materials to use: paper, magnetic figures, etc. They made a plan what to shoot in which sequence, then they took the pictures. At the end of the workshop the students adjusted their films with a little help from their teacher. The videos were shown to all classes that had taken part in the project as well as to some parents.

The third stage of the vidumath project was a conference held in June 2016 and attended by those involved in the project. Those students who had participated in the project were invited. They gave interviews to some of the members of the vidumath team. They created two new films together with the team and expressed their wish to continue their participation in the project.

Challenges

Some of the pupils encountered serious technical problems. They did not find it difficult to uploading photos to Windows Movie Maker. However, setting the right speed, adding music, and saving the new product as a film in the proper format turned out to be a challenge that teachers and students had to go through together. Not all movie files made at home could be opened at school. The teachers helped the pupils to correct their mistakes and the pupils tried again on their own. This approach – autonomous learning – had a good effect on classroom discipline. The pupils were more organized and motivated to deal with their tasks.

Successes

The students from Class 4G were keen on their work and made about 25 films. This would have been impossible without the support and assistance of their parents and teachers. The pupils learned plenty of new and interesting things about the world of mathematics. They acquired new technical skills and had great fun.

Even though they do not mention the term ‘symmetry’ or ‘mathematical equality’, these various video films helped the pupils to form abilities to recognize and define these notions through autonomous learning. In the process of video production, we had the many opportunities to discuss with the pupils about basic mathematical terms.

Outcome

The students from the 32nd Secondary School ‘St Kliment Ohridksi’ were very enthusiastic about taking part in the vidumath project. What motivated them most was a desire to make videos by themselves. They made more than 100 video films using the technology they had at their disposal. All films were made on time and achieved their goals.

The pupils and their teachers enjoyed the films; consequently, the workshop and the project work were successful.

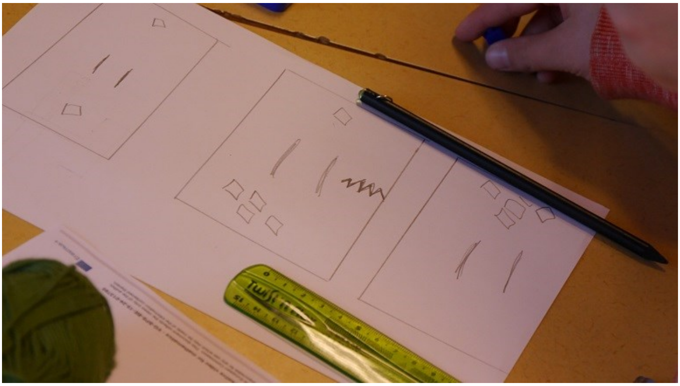
Evaluation

The method of autonomous learning was realized in the learning process through the production of many varied video films. Group work made pupils act cooperatively and enhanced their motivation to take part in the learning process. Their creative thinking developed further and they showed interest in mathematics.

This is a successful method that can motivate and integrate students with limited interest in mathematics.

Case Study 2: Revealing students' misconceptions

This case study shows how vidumath helps teachers to reveal students' mathematical thinking and for children to gain a deeper understanding.



Planning is essential for the mathematical learning process. The storyboard reveals students' understanding of the mathematical concepts.

Context

A vidumath workshop took place in Norway in the city of Trondheim. Twelve 7th grade students (12 years old) participated on Thursday, October 6th, 2016 from 8.15 to 13.40 hrs (5.5 hours including a one-hour lunch break and three shorter breaks). This was about half of the class. They were accompanied by their maths teacher and half of the vidumath team.

The students have used the equal sign since first grade, but they had never reflected on its meaning. They had had no previous lessons about equations and how to solve them.

Two days before the workshop, the students had been told that they would make videos. All students used their own smartphones. One student brought professional photo equipment like tripods and lighting. Another student had a smartphone tripod. The other students used books or chairs to fix the camera in place. All students were free to choose their favourite app. For showing the videos the teacher's laptop and a projector were used.

Case

Research (e. g., Kieran, 1981; Knuth et al., 2006) has shown that many students misunderstand the equal sign as an operational rather than a relational symbol. While this is no problem with arithmetical tasks in primary school, it becomes problematic in middle school when students solve equations. Since we promote vidumath as a method to reveal and correct students' misconceptions, it seems appropriate to conduct a vidumath project in grade 7 before children start with equations.

Approach and implementation

The project was undertaken in six steps as described in the booklet. The topic was chosen by the teacher. A member of the vidumath team introduced the project. He used a beam balance to explain the equal sign. The students worked in groups of two, three or four children which were assigned by the teacher. During the planning and filming the students talked vividly about the mathematical content, how to visualise it in the video and how to solve technical issues. The teacher was observing, while the vidumath team interacted with the students. They talked about the mathematical content, the planning and the filming and challenged the students to try more advanced tasks. A lot of time was used for post-production and to solve technical issues. Little time was left at the end: All videos were shown and appreciated, but there was no time to reflect on the content.

Challenges

Some groups had serious technical problems (e. g., fixing the camera or transferring the video to the laptop) and used too much time to solve them while other students had to wait. We will provide simple solutions in the technical support section of the vidumath website.

The students were very motivated and wanted to start filming right away. We had to pursue them to draw storyboards. It was not a good idea to show a beam balance in the introduction. Almost every group used a balance. In the videos from Sofia we find a much broader variety of approaches to visualise the equal sign.

Since the task was very open and simple, all students initially choose a simple approach. The team had to challenge them during the planning to try more advanced mathematical ideas.

Successes

The planning revealed that all students had a relational but concrete understanding of the equal sign, i. e., there must be the same number of objects on both sides, of whichever size or shape (e. g., four red cubes are equal to four blue balls). With support of the team, some students could overcome this and showed a more algebraic understanding in the videos, reflecting the idea that an object can be a symbol for something else.

Outcome

One video couldn't be uploaded due to technical problems. Three videos will be analysed here:

The video 'The equal sign' (https://youtu.be/53UYWE0ugGs) uses an animated beam balance and cubes combined with the symbols '=' indicating equal amounts and '<' if there is more on the right-hand side. In this case one cube is added to the left-hand side to balance. It reveals a concrete relational concept of the equal sign.

The video 'Snakes on scales' (https://youtu.be/LpmFWV4IJ8w) uses an animated beam balance with plasticine snakes combined with the equal sign and the symbols '✓' indicating balance and '×' imbalance. One green snake equals two yellow snakes, and one red snake equals four yellow snakes, hence, two red snakes equal four green snakes. It reveals a beginning of algebraic understanding.

The video 'BZHG8991' (https://youtu.be/ukfLbJHJK-g) uses different objects and animated symbols. It starts with comparing concrete amounts by counting; the equal sign is destroyed when the numbers of objects are not the same on both sides. The next part was produced after we challenged the students to use objects that represent different quantities. It starts with one big cube equals two small cubes and more objects are added until there are the same objects on both sides. The subsequent 'takes' show equations: One object plus one object = one larger object. By this it defines objects representing the numbers one, two, three and four. At the end it inverts the operation: the 4-object minus the 1-object = the 3-object. This reveals a broad understanding.

Evaluation

The case shows that both the storyboards and the videos reveal children's understanding of mathematical concepts. However, to challenge and finally change students' misconceptions, the teacher's intervention during the planning is essential.

Case Study 3: Loving to learn mathematics

This case study analyses students' motivation to learn mathematics and their perception of learning, in a vidumath workshop on equivalent fractions.

The activity was the production of a short video about equivalent fractions, using stop motion video techniques.

Context

This vidumath activity was tried out in a primary school in Trondheim, Norway during April and May 2016. The participants were approximately 70 students from three different classes in grade 6.

Procedures

The activity took about four hours with:

- 45 to 60 minutes for introduction, instructions, and group planning;
- 60 to 120 minutes for production of the video, sometimes including a restart to correct and improve;
- 30 minutes for finding music, creating a title and completing the credits;
- 30 minutes for evaluation.

The students used smart phones, tablets and the software Windows Movie Maker to edit the video.

Case

The teaching and learning of mathematics remains a challenge, as evidenced by international data on school outcomes and on the interest in choosing careers that involve mathematics (EACEA/Eurydice, 2011). Research also has demonstrated the importance of motivational factors in school performance in mathematics, in particular intrinsic motivation (EACEA/Eurydice, 2011). Consequently, analyses and implementation of teaching and learning strategies that contribute to a greater motivation to learn mathematics are highly relevant.

vidumath contributes to the teaching and learning of mathematics through the production of videos by students about key concepts of mathematics. The project explores motivational strategies that promote the interest for mathematics and, as a result, promote learning mathematics.

Approach and implementation

The teacher did not deliver any instruction about fractions but provided scaffolding during the session. Almost all students had a basic understanding of equivalent fractions. They had experience of fractions represented as a section of an area, as part of a set, and on the number line.

Almost all the students were allowed to form their groups on their own. The teacher only assigned a few students to specific groups. The students in every group had the same level of mathematics competence and enthusiasm for the work. Some lower-achieving students who needed more support worked together and received additional guidance.

The general steps, proposed in the vidumath task sheet to produce a stop-motion video about equivalent fractions, were followed as presented in the booklet. Materials and tools provided and used included Lego, clay, Jelly Men sweets and scissors.

At the end of vidumath activity, we handed out questionnaires, which were completed by 28 students (18 boys, 10 girls) and the teacher. The students filled in a short version of the Task Evaluation Questionnaire (Deci & Ryan, n. d.). This is a version of the Intrinsic Motivation Inventory (IMI), a multidimensional measurement device intended to assess participants' subjective experience and intrinsic motivation while taking part in an activity. The questionnaire addresses interest, enjoyment, perceived competence, perceived choice and pressure/tension, as well as perceived usefulness.

Challenges

Five children commented that there was no difficult part. Three children considered the filming difficult, while three other children remarked that arranging the movement of the pieces was the major obstacle. For two of the children, conceiving an idea and filming it posed a big challenge.

Successes

The students were interested in the task and worked hard to create the videos. Our surveys showed that the vidumath activity was linked to core elements of intrinsic motivation: enjoyment, perceived competence, usefulness and low levels of tension. For the students, the vidumath activity also challenged traditional conceptions of maths learning, as they learned math in a fun way during the activity. For the teachers, the vidumath activity fostered students' autonomy and self-motivation, deeper comprehension of maths and transversal competencies.

Results

The students produced 24 videos; they reported that the vidumath activity was very interesting. They affirmed that they were able to conduct the activity well and that they had some autonomy in doing so even though they rated their perceived choice at a medium level. They have shown a lower level of tension and pressure while conducting the activity and stated that they put a high level of effort into the activity.

The children rated the item 'This activity is useful for learning equivalent fractions.' high. 'Learning about mathematics' was the most frequent subcategory on the open question 'What did you learn in this activity?'. Most frequently, the children mentioned that they learned about equivalent fractions and learned math in a fun way during this activity.

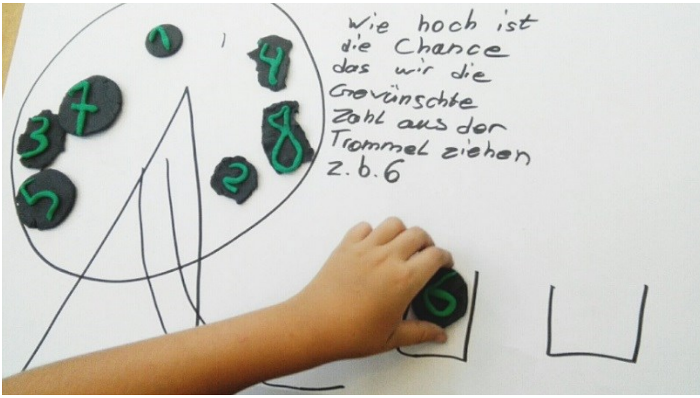
There was a statistically significant positive correlation between the perception of learning about equivalent fractions, interest and enjoyment during the activity, and perceived choice. Statistically, the interest while conducting the vidumath activity predicted the perception of learning equivalent fractions.

Evaluation

The results evidence that the active involvement of the students in the production of videos about mathematical concepts is associated with high levels of motivation signified by interest, perceived competence, autonomy, effort, and that these were correlated statistically significantly with the perception of learning. Although more research to analyse the impact of this strategy on mathematics learning is required, its motivational impact allows us to anticipate a potential at that level.

Case Study 4: Personal didactic reduction

Student-generated material enables pupils to individually develop didactic reduction that fits themselves and optimally supports their personal understanding, for instance, by focussing on a specific example, which renders the topic more graphic and reduces cognitive load.



One group of children picked a 2-from-8 lotto to illustrate a concept from combinatorics.

Context

This case study was conducted in Germany at FH Bielefeld's in-house outreach facility for pupils 'zdi-Schülerinnen- und Schülerlabor' on July 31, 2017. We asked local teachers to tell their pupils about a 2.5-hour-long workshop. It welcomed seven registrations, and had five participants, aged 9 to 13 (one girl, four boys). As visible from the age span, the background of the children was highly diverse. To cope with this, internal differentiation seemed inevitable, which provided a test case for our ideas on personal didactic reduction.

Even though most of the pupils brought (as requested by the team) their own smartphones and tablets, we settled for using our own tablets, which allowed everyone to work in a uniform environment familiar to the team. The workshop was led by one of the researchers (J. L.) and observed by a second (D. V.) who also helped with the tablets.

Case

'Didactic reduction' (Lehner, 2012) builds on the notion that all effective and efficient learning needs to start with a version of the topic that is reduced in width (only integer numbers when introducing addition) and/or depth (not mentioning the associative law when introducing addition). A typical form of didactic reduction is to start with an example and then to proceed in an inductive manner.

Given the diversity of the participating children, we hoped to see individual approaches to didactic reduction in action and hence picked the challenging topic of binomial coefficients (never actually mentioning this technical term): How many ways are there to choose *k* different objects (disregarding their order) from a set of *n* different objects?

Approach and implementation

We started out with a highly interactive, half-an-hour session, with one of the team in the role of a teacher at a flip chart. A discussion with all of the children seated around a table took place on how to compute one's chances in a 6-from-49 lotto, and which of the ideas brought forward would lend themselves for being used in a video. We asked the children to pick the favourites and form groups accordingly. They formed two groups, clearly separated by age.

These groups worked with a modest amount of guidance and intervention in terms of mathematics, presentation and technology for the rest of the workshop. They decided which of the available materials to use (such as paper, pen, putty and magnetic shapes), devised a plan on what to show, in which sequence, took photographs and edited the resulting video. The workshop ended with showing the videos produced by both groups to all of the children and their parents or siblings who had arrived to pick them up.

Challenges

As we expected from our previous experiments, getting the pupils to design a storyboard before starting to film is tough. To save time and not impede their motivation, we had to rely on the children's acting out their ideas with putty and geometric shapes beforehand rather than drawing a storyboard. As also is to be expected, we experienced classroom management issues, in this case with one lively and one quiet child supposed to work together in a group. The major intervention needed in this experiment was nudging the former child toward concentration and the latter toward communication. In the other group we had to ensure that not just one child acted as the all-knowing director and the others only executed auxiliary tasks (such as preparing putty figures), but everybody participated in the mathematics.

In total, the differences in the age and prior knowledge of the children posed far fewer difficulties than the differences in their behaviour.

Successes

Even though the topic was challenging, both groups managed to find a didactic reduction suitable for them: Whereas the older children created a demonstration for a hypothetical 2-from-8 lotto, the younger children showed in their video how many ways there are to arrange four different objects in a sequence (namely the factorial of four, a technical term that we did not mention, but that is a vital concept in the computation of a binomial coefficient).

As we hoped, during the preparation and the filming, we were able to discuss the mathematical concepts with the children, clear up many misunderstandings and even repeat the multiplication table. It was pleasant to see that the child who was very quiet in the initial session opened up during the preparation of the filming and the filming itself.

Outcome

The resulting videos were finished on time and turned out as they were planned. They do not, however, lend themselves to stand-alone use by other children. Rather, they must be accompanied by a narrated explanation. Putting themselves in the position of the viewer is tough to ask from children of this age.

We did not conduct formal pre- and post-tests, but hope from the interaction that we experienced and from the problems that we were able to dispel that all participating children indeed learned something about mathematics (albeit everyone something slightly different). In addition, both the children and their parents liked the outcome. In total, the workshop was a success.

Evaluation

We did see a personal didactic reduction in action and we learned that the vidumath approach can handle a very diverse group of children. Group work such as videomaking tends to exacerbate classroom management issues; handing this requires specific teacher training. We notice as potential benefit that vidumath may be a promising communication strategy to reach introverted children.

Case Study 5: Issues in video-based learning

The case study will explore the implications for the project of using different video technologies.

Teachers during the vidumath teacher training workshop in Sofia, Bulgaria, using traditional video technologies

Context

The study is applied to a cross-section of nine vidumath workshops where the Kulturring media team were present: piloting and teacher training in Sofia (06/16), piloting in Trondheim (09/16), two student piloting workshops and one teacher training workshop in Coimbra (03/17), two student teacher workshops in Bielefeld and Leipzig (06/17) and a student teacher workshop in Berlin (10/17).

Case

The study explores how two different video technologies make a difference to the vidumath workshop design. We distinguish between the use of traditional video production (camera and computer for editing) and the use of mobile technologies (tablet or smart phone).

Approach and implementation

Within the cross section of the vidumath workshops the two different technologies were applied. The choices were made based on the technologies available to the hosting organisation – sometimes this depended on any regulations regarding mobile technologies being allowed or not (across Europe there is a range of policies regarding the use of mobile technologies in the classroom). We did not prescribe what technologies should have been used. The main technologies used in the nine workshops were:

- Piloting workshop Sofia (June 2016): traditional
- Teacher training workshop Sofia (June 2016): both
- Piloting in Trondheim (September 2016): mobile
- First student workshop Coimbra (March 2017): traditional
- Second student workshop Coimbra (March 2017): traditional
- Teacher training workshop Coimbra (March 2017): traditional
- Student teacher workshop Bielefeld (June 2017): mobile
- Student teacher workshop Leipzig (June 2017): mobile
- Student teacher workshop Berlin (October 2017): both

Challenges

Both technologies bring challenges and successes. The challenges with **traditional video production** were:

- slower approach, and a more time-consuming method due to the use of two pieces of hardware (camera and computer),
- a range of different platforms (primarily different version of Windows) that resulted in incompatibilities,
- the discontinuation of Windows Movie Maker in January 2017.

One of the core issues is the loss of Movie Maker, a standard tool used in all our video education work. At this moment, we are not happy with any alternatives but hope that the upcoming VLC video software will be a good replacement.

Issues with different computer operation systems have been common, as has the issue of no access due to lacking administrator rights. These issues need to be resolved before a workshop to avoid lengthy waiting times during the workshop.

Challenges with **mobile technologies**:

- Issues with software downloads if devices were not online
- No adjustable lens built in, complicating some of the recordings
- More complicated to fix devices on a tripod
- Problems with exporting the finished video for viewing with the entire class

As with the above – it is important to check the devices beforehand to make sure that the necessary software is installed. There are special tripod adapters, but students have been creative in overcoming this problem (tripods are important for stop motion). The exporting of the finished video has been the most time-consuming issue, mainly due to a lack of wireless connections in schools. There are different ways around this issue (such as uploading through 3G, connecting via USB). Again, it is helpful to check up beforehand.

Successes

All workshops achieved success using either technology. Participants were engaged, and in nearly all cases the projects were completed. The traditional video production offered a more versatile system with more creative usage especially where the camera work was important (one shot and creative explorations). Mobile technologies were quicker to use and were easier for students since they are more familiar with them.

Outcome

Most video outcomes are uploaded on the vidumath playlist: https://www.youtube.com/playlist?list=PLHgH52iw_33lLXP-PmFbRWAch4v3I17wL

Evaluation

The upcoming initiative from the German government with the 'digital pact' (introducing mobile technologies and internet into schools), https://www.bmbf.de/de/sprung-nach-vorn-in-der-digitalen-bildung-3430.html) is in line with what we have experienced in our workshops: Mobile technologies are used more and more for media projects.

We are not sure if the way to go forward is for governments to supply mobile technologies. Mobile technologies are already present in most of the students' pockets and it would make a lot more sense to find useful ways to bring them together in the world of education for the long term.

We have been excited to see how creatively all workshop participants used video production as a tool to support maths learning.

Case Study 6: Autonomous learning by a teacher

This case study describes autonomous usage of the project. Two different usages will be described.

Title frame from a video made by students in Poland

Context

Poland, Szkola Podstawowa nr. 26 in Wroclaw. Teacher Iwona Kowalik March to April 2017

Case

This case study describes how the project was implemented and used autonomously by teachers. This is an important factor in the project as we can show that the project can run autonomously, without the support of the project team. This is especially important for the sustainability of the project and also shows that the project can be easily used in the classroom. This case details how a teacher in a school in a country outside of the project partner countries was recruited, instructed and carried out the vidumath project autonomously.

Approach and implementation

An Internet dissemination campaign to bring the vidumath project to the attention of mathematics teachers across Europe took place. As a result, a mathematics teacher in Poland found information on eTwinning and expressed an interest in a thread on Facebook as she was looking for new ideas to use technology in her teaching. This was followed up by direct messages, then emails and finally a Skype meeting.

In the Skype meeting, a clear step-by-step description of the project was shared and examples of students' completed videos shown. Links were given to the website and its resources; documents were shared. The teacher asked questions that were answered. Finally, further support was offered as well as instructions on how to join the project wiki where a page was created for the school.

In her classroom, the teacher initially showed the students existing videos from Norway and Bulgaria. She then started the project with students who she knew to be proficient in maths and asked them to do the project using fractions or scale. She then worked with the students on learning how to use the stop motion app.

They then chose a topic and worked on their storyboards. They prepared backgrounds, props and slides and then filmed their videos. Afterwards they did editing, adding titles using Windows Movie Maker.

After the first test, she asked the rest of the students to join and allowed them to choose their own groups of three or four students and each group chose one topic.

The teacher asked the groups to show her their storyboard before they started recording; some, however, did not do so and ended up with mathematical mistakes. The teacher then told them that there were mistakes but allowed the students to find and fix. The students autonomously improved their work.

Successes

Based on the information given the teacher, she managed to complete a vidumath project with her students. The results are available at the link below.

The students found learning to use the stop motion app very easy and fun to use. They found making videos particularly helpful with learning fractions and did not find any problems in using the project.

They worked very well together in their groups, helping each other, sharing ideas and resources and taking responsibility. They also showed more creativity. They were very proud of their work when they showed to the other students and want to make more videos.

Outcome

The teacher implemented the project autonomously using the documentation, videos and help from the messages and Skype meeting. The students who took part in the project produced nine videos: http://vidumath.wikispaces.com/Szkola+Podstawowa+nr+26%2C+Poland

These videos are available on YouTube in the project playlists and on the 'School' page on the vidumath wiki.

Evaluation

The teacher found that the students were very engaged with the project, particularly because the students became teachers for their peers and that they can use their smart phones or tablets that they love.

The most important lesson that was learnt is that the prepared documentation and videos are competant to be used autonomously but that additional support may be needed. Since the date that the support was given additional documentation that covers the parts that were not available in early spring 2017 has been added to the website, that will reduce the need for support.

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