A study of involuntary distance teachers' experiences

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Abstract

In the spring of 2020, a study was made on university teachers in mathematics who, at very short notice, were forced to change their teaching to distance education due to the Covid-19 restrictions.

Five teachers who had not planned to teach at a distance have been interviewed and their views on, and experience of, distance learning have been analysed.

The social interaction between teacher and student was important not only for the students' well-being but also for the teacher's and that it influenced the teacher's decision-making during the lesson. The lack of visual and audial input from the students affected the teachers' decision-making process.

The teachers perceived the technology as something problematic or limiting. Since not just the tool itself affects the user, but also the user's knowledge and skill affect how the tools is used, it is hard to say whether their ability to teach would either benefit or be disadvantaged in the long run by the change of tools.

In some cases, the teachers were, by the circumstances, forced to retain a teacher-focused teaching instead of a student-focused one, which could affect their relationship with the students in the long run.

The attitude towards distance education slowly became more positive, given that the form of teaching they were used to was still at the centre and that the goal was not to completely replace the way a teacher communicates with a student.

Background

Users adopting novel technology is a complicated and dynamic process based on many factors, such as experience, voluntariness of use, facilitating conditions, among other things (Venkatesh, Morris, Davis, & Davis, 2003). Early adopters commit a large amount of time to integrate their tools and are likely to use new tools no matter the complexity. Teachers who are not early adopters are less likely to use new tools and are inclined to abandon the tools in the process (Aldunate & Nussbaum, 2013). What happens if a group of teachers who does not

belong to the early adopter group is forced to set up a distance course and has no opportunity to back out at all during the entire process?

In the spring of 2020, all over the world teachers were forced to change to distance teaching. This led to a unique opportunity to follow how teachers at very short notice and without having chosen it themselves were forced to rewrite their material and adapt all lectures, exercise tutorials and exams to be given with the help of digital tools.

Research questions

This study examines the teachers' creative process when they are forced to change to teaching in an online environment. The research questions are:

- How did the online environment affect their structural (macro) decisions and their in-the-moment (micro) decisions?
- How do the teachers experience the possibilities to use their new tools to perform good teaching?
- How did the teachers experience that the change to online teaching affected their focus on the students in their teaching?

Previous research

Venkatesh and others introduced the concept of a unified theory of acceptance and use of technology (abbreviated as UTAUT) which tries to explain how a person uses technology as a tool in a certain situation. The theory identifies four key moderating variables: gender, age, experience, and voluntariness, and four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. The variables affect the constructs in different ways to generate the behavioural intention and the use intention (Venkatesh, Morris, Davis, & Davis, 2003).

The teachers at the forefront of using technology in their teaching are usually very used to working with computers and are interested in changing their teaching and adopting new technology regardless of its complexity, while teachers who are not early adopters are less likely to use new tools and are inclined to abandon the tools in the process (Aldunate & Nussbaum, 2013). Glass (1999) gives a model for the learning curve when adopting new technology claiming that when learning a new tool productivity initially drops and reaches a local minimum after a time. Productivity then slowly improves until it surpasses the initial productivity, converging to a local maximum. The time frame for the changes and the benefits differs depending on the situation, but the basic shape will remain the same.

An example of this are video lectures, which on one hand are considered valuable for reviewing theory since they are always available and let students work in their own pace (Fulton, 2012), but at the same take much time to produce them. This can make some teachers hesitant to use them in their teaching. Among other things control of teaching, time required, and the teacher skills are important factors for switching (González, 2012).

Frameworks

A theory that can help analyse the interview answers is described by Schoenfeld (2010) in the book *How we think,* on how teachers are forced to make many decisions when they teach. Some of the decisions are at the macro level (e.g., the structure of the lectures), while others are at the micro level (e.g., the way of answering a student's question). As a person enters a context where a decision is made, the process is a function of the resources, goals, and orientations of

the person. The individual orients himself in the situation and knowledge is activated. Goals are set, where there are both macro-level goal structures as well as micro-level ones and they are set both consciously and unconsciously. Decisions that are consistent with these goals are made on which direction the individual should go and what resources should be used. If the situation is known, the process is relatively automatic, but if it is not known, the decision-making process can be modelled by using the individual's subjective expectation values and available options.

Another central concept concerning digital tools is Instrumental Genesis: a process based on two defined components: Instrumentalization - how a person (with knowledge and working method) uses a tool (with limitations and possibilities), and the opposite, Instrumentation - how the tool affects the person. This process interacts and leads to, what is perceived as, the instrument that 'does something'. (Trouche, 2005). A good example of this is given by Monaghan (2016), who asks himself the question:

> Consider the learner action of keying in 123 x 45 = on a calculator and getting 5535. Did the child get the answer 5535? — Wertsch would answer 'no'. Did the calculator get the answer 5535? — Wertsch would answer 'no'. Did the child–calculator dyad get the answer 5535? — Wertsch would answer 'yes'. Wertsch would give similar responses if 'calculator' was replaced by 'standard written algorithm' or 'tables of logarithms' or... From this child–calculator dyad position it is meaningless to say that a calculator is either beneficial or detrimental for the learning of mathematics because such statements consider just one part of the essential dyad.

A final piece of theory used in the analysis is that of Prosser and Trigwell (1997), who claim that teachers have a more student-focused approach in their teaching, rather than a teacher-focused one, if they:

- perceive that they have some control over what and how they teach,
- perceive their class sizes are not too large to [allow] engagement in interaction with their students,
- perceive that their students are able to cope with the subject matter,
- perceive that teaching is valued in their departments,
- perceive that their academic workload is appropriate.

There is a correlation between a teacher-focused teaching and students reporting to have a surface approach to the learning of a subject (Trigwell, Prosser, & Waterhouse, 1999). Being able to develop a good relationship with the students is also an important factor in terms of students' wellbeing. (Hagenauer & Volet, 2014; Davis & Dupper, 2004)

Method

Five teachers at a mathematics department in in Sweden participated in the study. Teachers 1 and 2 had some experience with distance teaching and online tools while the other three had none. Semi-structured interviews were chosen as a method to maximize the opportunity for teachers to express themselves. Four interviews were held with each of the respondents, distributed evenly over a 10-week period, the final interview conducted after the completion of their course.

All teachers' courses were given at half speed and lasted for 10 weeks. The first three interviews were shorter (15-20 minutes) and were held after study weeks 1, 5 and 7. The fact that these interviews needed to be short was mainly due to the teachers being very busy making everything work and not daring to schedule too much time for follow-up. The questions asked were:

1. What have you done, specifically, for your course this week?
2. Was there any element that was extra challenging? Why?
3. Was there anything that went better/easier? Why?

The last interview was held after the exam week and could therefore be twice as long and more meticulous. The questions that were then asked were:

1. What is your summarized impression of the course now in retrospect?
2. If you were to do it all over again, would you do something different?
3. How do you view distance learning today?
    i. Do you think it can be good?
    ii. Are there any moments that have been more negative?
    iii. Are there any positive aspects you noticed? Which?
    iv. How do you think the students feel?
4. Do you think that you have succeeded in making the mathematics understandable? Was there any occasion where your tools hindered you? Any time your tools were effective for this?
5. What do you think is the pedagogical potential of the tools?
6. What pedagogical elements do you think you cannot achieve in distance teaching?
7. How did you work to make the teaching goals visible to your students?
8. Other thoughts?

The interviews were performed via an online video call and recorded, because, according to Kvale (1994), there are good reasons to save them in some way. Audio recordings give the researcher the opportunity to focus on the subject and the dynamics. Word selection and pauses etc. are saved in the recording and can be detected later. You can also make a video recording, which then even saves the visual input from the situation, which can provide important information (such as posture and facial expressions). However, as a video adds more information, a trade-off must be made as to whether the information lost is meaningful enough. In the case of the teacher interviews, video recording was not chosen because the focus was not on analysing the teachers' feelings per se, but their decision-making process in relation to the teaching.

To analyse the interview answers, notes were taken during the interviews at the same time as the conversations were recorded. The notes were not verbatim but contained a categorization of the answers given based on the fundamental theories described above and the main tracks of the research questions. The recordings were then listened to and transcribed, and the interview notes were compared with the transcript. With this method a categorization of the true answers (from the transcript) could finally made.

Results and discussion

The structure of the courses followed the traditional way of teaching mathematics, with lectures where the students are to come prepared and the teacher explains some theory,

followed by exercise sessions where the teacher first solves some typical examples on the board and the students finally themselves solve recommended exercises from a list.

All teachers used Zoom (https://zoom.us/) as their platform for their lectures, mostly because this was the tool recommended by the department. However, they used it in different ways: some chose to give live lectures (which they also recorded and made available afterwards), others chose to only offer recorded lectures and use Zoom for live question sessions. Three teachers used a drawing pad to write mathematics, while two chose to go through and explain their handwritten (scanned) notes instead.

Four teachers held their exercise tutorials in Zoom, and one used Discord (https://discord.com/) instead. In Discord you can create several channels where students can chat via both text and voice channels. If a student asks a question in text form, it stays there indefinitely, and the students could therefore ask all their questions immediately when they came up, and the teacher could then process them in chronological order. Much of the communication between teacher and student therefore took place in text form, with an occasional attached picture.

Decision-making process

Something that was very clear right from the start was that all teachers thought it was unnatural to communicate with the students via a chat. The big problem was that the students preferred to express themselves in text, even if they were in a video meeting. The teachers suffered from not being able to see the students' reactions and thought that something was missing. In the fourth interview Teacher 1 expressed this in a short and concrete manner:

> It is a bit tough with the workload. It was tough not to get back the energy you usually get from the students during the lectures.
>
> -*Teacher 1 Interview 4*

Teachers 1 and 2 felt that there was a lack of both the passive and active feedback students give when they meet for real:

> It is hard to feel the atmosphere in the classroom, like you do on a real session, where, even if you do not talk to the students directly, you hear what they are talking about with each other.
>
> -*Teacher 2 Interview 1*

> It is harder to get in touch with the students, that is how I feel. Even if it is possible to make substitutes, such as online one-by-one sessions, or getting questions at lectures, it is more difficult to get feedback on whether what you say helps or not. If I should continue or if it is just a short question which needs to be answered by a 'yes' or a 'no'.
>
> -*Teacher 1 Interview 4*

Schoenfeld's theory that the teacher shapes the teaching with many micro-decisions based on the students' reactions in the moment can in some sense explain why the teachers felt lost. Teachers are thrown into a situation they perceive as familiar, as they have taught many courses before. They are prepared with materials, goals, and orientation linked to the teaching

method they are used to, but suddenly something essential (even though often passive and invisible) is removed: the students' reaction. The uncertainty thus increases.

The teachers who participated in the study had not prepared any special scripts for their lectures; their notes looked exactly like they had done for a regular campus lecture and this type of structure is based on the students providing input. Teacher 1 even described how the feedback was not enough even when they asked questions:

> When I gave lectures on campus, I had a feeling if what I said sank in, especially if I get a question from a student, then I understand if I said enough or if I must explain it again. It is absolutely not possible if I receive a question via text or even at a meeting via Zoom or Discord. When I helped people in Discord, they often did not have a camera turned on. I have heard that many people choose not to turn on the camera when watching from home.
>
> -*Teacher 1 Interview 4*

Here, visual information was lost, which is reminiscent on Kvale's discussion about facial expressions and posture when it comes to interviews, and that a recorded video adds more information than an audio recording (Kvale, 1994). More information is being transferred at the time the question is posed, but since the teacher neither must save the information nor go back and process the video information afterwards, but only react to it in the moment, disadvantages such as storage and time consumption disappear, but the advantages remain, and having the camera turned on is therefore preferable in an online context.

Teaching in front of a camera can easily just become a monologue, and the question arose if they were teaching or just producing a video. This can be seen in the second interview with Teacher 1, who had previous experience with online teaching:

> So, it is hard not seeing the students. I have had something of an existential crisis and wondered what I actually am doing since it is so hard when you receive no input from the students.
>
> -*Teacher 1 Interview 2*

A concluding remark. During the first interview Teacher 3 showed how important feedback can be:

> I first tried to put the computer in front of the blackboard to lecture as usual. The problem then was that the students did not hear me because the microphone was not good enough. I ordered a headset, but it was wired, so it was not possible to go between computer and blackboard. The lecture felt like a disaster. The students then offered to lend me a writing pad, so the teaching changed form. Now the teaching takes place via Zoom and a drawing surface on the computer, with a split screen.
>
> -*Teacher 3 Interview 1*

What is remarkable is that the teacher, through a dialogue with the students, changed the whole execution of the teaching. This feedback concretely changed a macro decision of a

course, so it is obvious the social interaction is not just for regaining energy by talking to other humans (even if that certainly is important), but it is important in the actual decision making of the teacher, it gives new input to the decision-making function, and as we know, even a small change in the input parameter of a function can lead to a large change in the output.

Student-focus and teacher-focus

As expected, the sudden transition did not favour the teachers' initial attitude to distance teaching. Teacher 4 mentioned it several times during the first interview:

> It is awkward because it is forced, and everything is new. I really felt bad in the beginning, I am not used to feeling so bad to go to work.
>
> *-Teacher 4 Interview 1*

> [Something that is difficult is] to record lectures without having anyone in front of me. It is terribly difficult. I must redo many times and it is terribly embarrassing to watch the movies. I usually have a lot of contact with the students and now none. A terrible thing happened recently. I recorded for half an hour with the microphone accidentally turned off and had to redo EVERYTHING! Recording 30 minutes otherwise takes two hours. Yes, since first you must rehearse, then it takes 30 minutes to record. It will take maybe 20 minutes to convert the file and another 30 minutes to review it.
>
> *-Teacher 4 Interview 1*

The stress was largely because the macro decisions they made before the start of the course were no longer relevant as the actual execution of the course had changed, but also to the problems with their technology. As teachers lost control over how they taught and the workload increased significantly in a short time, their focus shifted from student to themselves, to the teacher, following the first and fifth points by Prosser and Trigwell (1997) i.e., that the teacher has a more student-focused approach if they perceive that they have some control over what and how they teach, and that they perceive that their academic workload is appropriate. Such a change could in the long run affect the students' approach to learning to become shallower (Trigwell, Prosser, & Waterhouse, 1999) and perhaps also affect the relationship between teacher and student.

From the second interview an onwards, everyone seemed a little less stressed because a few weeks had passed, and the new course execution had taken shape.

During the second interview, each teacher came up with suggestions for future areas of development. Some were long-term improvements, such as Teacher 5 who suggested buying laptops with touch screen instead of using writing pads. The argument was that it was unnatural to write on a tablet lying on the table while simultaneously looking at the computer screen in front of you to see what you had written, and that a laptop with a touch screen more closely simulates the way you write on a board. This change would make the teacher feel more at home, which would be a facilitating step to online teaching.

Other proposals were short-term ones. Teacher 4 had a test where the proctoring consisted of the students sitting in front of their webcam in Zoom, but it turned out that the software allowed the students to send private messages to each other. The teacher obviously wanted to

change this setting on an upcoming test. Such a decision may seem small, but it shows that the teacher is solution-oriented, and above all it helps the students understand the seriousness of the situation, and make it feel like a true examining element.

Teacher 3, who streamed lectures from home, wanted to buy a dark backdrop to have behind the back, so that the students would not be distracted by what was going on in the background, but also to simulate having a board behind the teacher. The teacher then decided to repaint one of the walls at home green to have a green screen if needed. This teacher wanted to create a better teaching environment for the students, which is also, like the decision to limit the chat or have a touch screen instead of a drawing pad, to make teachers and students feel like they are on Campus.

When the teachers feel at home with their teaching, when they are aware of and used to their learning instrument, i.e., when they feel they are in control of their teaching, they are more likely to have a student focused approach instead of having to think about themselves too much (Prosser & Trigwell, 1997), which is, as previously stated, very important for the students' learning of the subject (Trigwell, Prosser, & Waterhouse, 1999).

That teachers want to simulate the inherited and known teaching situation is reasonable; to be able to convey the knowledge in an unobstructed, student-oriented way, without obstacles, all disturbances must be peeled off. This is also important to increase the opportunity for students to receive the message being conveyed. With this presence and student focus the teacher can develop a good relationship with them, which among other things can lead to reduced drop-out rates and help the students achieve better results. (Hagenauer & Volet, 2014; Davis & Dupper, 2004)

The thoughts about future improvements were mostly about changing a course in the far future rather than the present one. A major reason for this was described by Teacher 2 who would rather stick to what the students were used to, rather than trying to make major changes and go through the process where the students had to get used to something new again:

> I have continued as before, have not made any major changes ... When I talked to the student representatives. They were amazing. They had on their own initiative conducted a small survey among the students in the course… And they did not experience any major structural problems in the course, that something absolutely did not work. You must try to find the right 'level' on what to react to and what to just accept… [The teaching] will not be perfect, but the risk if you start to change a lot of things now, you risk confusing them even more.
>
> -*Teacher 2 Interview 2*

The stress of constructing a distance exam and the understanding that this way of teaching might continue after the summer made them focus on how they could create a teaching system that was reproducible and good enough.

The teachers' attitude towards distance teaching in many ways came down to if they could focus on the students learning and prosperity, or if they had to concentrate on their own understanding of the tools and well-being, in line with Prosser's theory, and it seemed hard for them to focus on both things at the same time:

> Right now, I am way too focused on the technology, so I miss parts of the lectures sometimes.
>
> *-Teacher 3 Interview 1*

> *Teacher 4:* There are moments of stress all the time when you do not know how to do something … It is hard to explain, but you need to have another kind of focus when you record. It is a strain, because as soon as I click on record everything must have a decent flow.
>
> *Interviewer:* You become aware that you are recording.
>
> *Teacher 4:* Yes!
>
> *-Interview 2*

Instrumentalization and instrumentation

Throughout the period, the technical difficulties could be divided into two categories: *problems* that were due to temporary bugs or unfamiliarity with the tools, i.e., things that could be sorted out or in some way, and *limitations* in the teaching due to the technology. Both types affected both teachers and students.

During the first interview, after the first study week, all five teachers experienced problems with their technology. An example of a problem was when Teacher 5 sent out two Zoom invitations to the students:

> One thing I did wrong. When I sent the invitations to Zoom I accidentally, I guess I was unexperienced, I accidentally created two invitations, so with the invitation I sent the students could not access the lecture.
>
> *-Teacher 5 Interview 1*

A combination of problems and limitations also occurred:

> Some purely practical things that have been messy, video hosting has not worked very well. On the one hand, I sit on my laptop and have a very limited GPU, so exporting a video takes forever if you are to do one with decent quality. Then, unfortunately, there also seems to be a problem with these video services. I use Box because there were problems with 'Chalmers Play'. This was the easiest thing for me, but I still have students who have problems. They cannot watch the movies and it seems to depend on which browser they are using.
>
> *-Teacher 2 Interview 1*

The teachers had problems with implementation, and the students failed to solve certain problems on their side. In addition, all teachers had troubles ranging from creating and managing breakout rooms (digital group rooms for private discussions in Zoom), to things such as the camera, microphone, tablet, or digital pen not behaving as expected. The technical problems were solved during the course (already at the second interview they were almost non-existent) and almost all hardware problems turned out to be due more to stress and unfamiliarity than broken technology.

Some of the limitations that affected the teaching could be solved, for example that the recorded video lectures took up too much space in the learning platform Canvas. Already a week or so after the first interview, the space in Canvas was significantly expanded. The teachers were thus no longer punished by creating content-rich and more wide-ranging material. Interestingly, all teachers seemed to expect the file space to be expanded in some way, none of them stopped creating videos while waiting for the solution or showed any sign of giving up on that idea. Teacher 1, chose to post the lectures on YouTube instead right from the start, so good alternatives were already known to some.

The limitations that remained during the latter part of the courses were of such a nature that they could not be solved in a simple way, so the teachers had to shape the teaching according to them. The teachers experience the technology to be in the way to conduct 'regular' teaching. They had a clear idea on what the learning instrument would look like. They sometimes expressed themselves in a way that showed that they experienced technology as foreign and that it to some extent prevented them from teaching in a preferred way. They perceived the instrumentation process, that the tool imposed a limitation to their person:

> Uploading videos is a bit like taking care of students' notetaking. If you do it really well, the students may feel that they can relax and try to follow the reasoning. If the videos are uploaded, they are not afraid to get lost during the lecture. If needed, if they do not follow the reasoning, then they can click on the videos and find out where they got lost. If you want to do it in a live Zoom lecture you must have tools that do not make the learning experience worse. The writing pad has a severe defect, of course you can practice the skill, but you look at the computer screen but write on the pad. If you want to do it in a better way you need a tablet where you write on the screen. The only problem is that it is expensive!
>
> -*Teacher 5 Interview 4*

> I do not think my blackboard-technique works well here. I usually write a lot on a blackboard, which does not fit in the same way on a small screen. I do not usually write much extra material that I post in addition to lectures. I am somewhat more organized with a regular blackboard, the drawing surface is smaller than a blackboard and training is required to know how to organize the surface, what to erase, and other things.
>
> -*Teacher 3 Interview 1*

Teacher 3 showed great humility by not only blaming the technology for the mistake but acknowledging that there may be a new skill or knowledge one must obtain to use the technology properly; this is more balanced since it also considers the instrumentalization process.

Overall, the teachers were inquisitive, willing to learn and cautious in dismissing the technology, which shows the reverence they feel for their work. At the end of the studying period, Teacher 1 wanted to explore the phenomenon of flipped classroom:

> I am thinking of making it more 'flipped classroom'. Invest more time in making many videos and have more occasions to discuss in Zoom. Maybe replace some tests with some form of group work? Mostly to get the discussion between the students and me going … and force the students to show up.
>
> -*Teacher 1 Interview 4*

After being forced to use technology extensively in the course, this teacher started thinking outside the box and considered how new aids could be used to get students to increase their presence and activity in other courses. One must remember though that this teacher had shown interest in these ideas before and was open to change the ways of teaching.

Teacher 3, with no previous experience of distance teaching, did not see it as something to use in future courses, but just found some value in emergency situations:

> It was a unique situation, and it works as a kind of temporary solution, but not a serious long-term solution. You can use digital tools more, for example if the teacher is ill and should not come to work, so that the students are in the classroom and the teacher on a screen. You can also stream lectures, so that if the students are not well, they do not have to come ... We have recommendations we must adhere to and this puts pressure on everyone to be healthy when they come to the department. You must decide for yourself if you are healthy, so you have pressure on yourself to be healthy. You can avoid situations where the teacher takes aspirin and comes anyway, you also avoid having substitute teachers but can take the classes yourself.
>
> -*Teacher 3 Interview 4*

Even Teacher 2 (who had some previous experience) just saw it as something that possibly could enrich teaching sometime in the future, when properly developed:

> I have just taken one of our pedagogy courses and there we discussed this and both from the discussions and from what I have seen, I think that pure online teaching that we have now, will always have a difficult time to reach the same quality level as an approach where it there is some 'physical interaction', where you meet in real life. It is something that has emerged more and more as something extremely important to me. It does not work as well without it. We have had to try to decrease the impact of that component disappearing. You can do a lot, but after the pedagogy seminars, I am not convinced that anyone has solved it so far. Before that point in time, if I had a choice, I would not choose a completely online solution for a course.
>
> -*Teacher 2 Interview 4*

Conclusion

Lack of visual and aural feedback from the students affected the teachers' micro decisions defined by Schoenfeld (2010). In a physical classroom hearing if the students start to whisper

with each other, seeing their facial expressions, noting what they say during the break, and the like, helps in making micro decisions. As stated by Teacher 1 "… it is hard not seeing the students. I have had something of an existential crisis and wondered what I actually am doing since it is so hard when you receive no input from the students".

If a department wishes that the teachers use new (online) tools in their teaching it is important that they let the teachers feel they are in control of their teaching and that the time required is reasonable (González, 2012), and since the teachers micro-decisions were heavily affected by this drastic transition and this setting was not favourable to persuade teachers to accept the tools.

The teachers' showed underlying understanding that their focus had shifted, and that it was hard for them focusing on both technology and teaching at the same time. Teacher 3 stated during the first interview that "Right now, I'm way too focused on the technology, so I forget parts of the lectures sometimes". The teachers indicated that several of the prerequisites for student-focus teaching, as described in (Prosser & Trigwell, 1997), was lacking.

As stated previously, teachers who are not early adopters to technology are inclined to abandon the tools in the process (Aldunate & Nussbaum, 2013), but this group had no choice but to learn to live with them. In some situations, the teachers therefore had to choose a teacher-focused teaching instead of a student-focused one, to be able to get by.

It is pointless to just claim that teachers' ability to teach benefits or is disadvantaged by computerization. Understanding that there exists a teacher-computer dyad (the learning instrument) is vital in understanding the teaching process and despite its potential, it was obvious that the teachers were not convinced that online courses could completely substitute traditional teaching. As an analogy of this, imagine a group of musical artists who, on the way to the stage, are given new instruments than the ones they practiced with and are forced to perform with these instead. Their initial reaction would naturally be that the instruments are in the way of a good performance, which is certainly true, but if they would think it through, they could also acknowledge that their knowledge and skill is imposing a limitation on the musical instrument they were given and that probably someone with another set of skill and knowledge could make a good performance with that tool.

Following the learning curve by Glass (1999) the teachers experienced problems early on and were stressed by the feeling that their productivity had dropped. After the local minimum was reached things slowly started to improve, and even though none of the teachers claimed their productivity ever surpassed their normal level of teaching, some teachers, like Teacher 2 (who had some previous experience in distance teaching), saw future potential in reusing material for future courses.

Despite its potential, it was obvious that the teachers were not convinced that online courses could completely substitute traditional teaching.

As a conclusion, a summary of the teachers' energy levels at the end of the study comes from Teacher 1, who, at the start of the fourth interview answered the question "How are you?" by saying: "It will be nice to have a holiday soon".

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