Early 2020 the world experienced a outbreak of an unknown virus. This spread of Covid-19 resulted in lockdowns all over the world. As a result many educational institutes were forced to close their doors and had to switch to other ways of teaching. This was not an easy and smooth task. Time to adjust to this new reality of the lack of face-to-face teaching was limited and the expertise on how to do so in alternative ways was widely dispersed. Secondary educational institutes, which provide compulsory education, were confronted with an additional problem. Many of the students they have within their walls have not already been able to develop the skills that are needed to take responsiblity for succesful self-directed learning. Although there are (many) exceptions to this, the ages of these students mean they need thoughtfully designed lessons and guidance. Now the face-to-face support of these students was disrupted by lockdown of schools, even the most conservative teacher had to find ways to implement technological tools to continue their guidance and education. Even teachers who already used technology tools within their lessons, discovered that teaching in a blended form is quite different to teaching online without the opportunity to see your students face-to-face inside a classroom. This article tries to offer some guidelines for individual teachers to adjust to the necessity to rethink the role of technology in their education.

It all begins with a vision on education

Before we even spend a word on how to use technology in your lessons in a well-considered way it is important to acknowledge that no teacher is the same. Each and every teacher around the globe has his or her own specific thoughts and beliefs on what good education should look like. In many cases elements of these thoughts and beliefs will be reconizable in some sort of common vision of the educational institute the teacher works for. After all, if this is not the case the teacher might be working in the wrong environment. On the other hand, no teacher will ever be, nor should be, a blueprint of the common vision published by the educational institute. It is quite common for teachers to uphold their own personal and professional assumptions of what successful education in their own classroom should look like, besides the shared views of the schoolcommunity.

In 2017 Liz Kolb published a book on the thoughtful integration of technological tools in education. The title of her book, _learning first, technology second_, implies the importance for teachers to take some time to reflect on what they think is important in their education. How do you think your students learn best, and what pedagogical approaches are needed to stimulate them to learn? It is important for teachers to realize what their assumptions are, regardless of whether or not they are able to see your students inside a classroom. After all it are these assumptions and beliefs that shape any teaching that is delivered by educational professionals around

the world. In times the traditional relied on methods of teaching of teachers get disrupted, like during the lockdown of schools due to the Covid-19 crisis, teachers have to rethink their approaches, but will not have time to really reflect on their vision on education as a whole. The quest is how to stay true to ones beliefs and assumptions, but while doing so continue this education in another form. When face-to-face education is impossible, technology will have to be involved in this process. But how to do this in a thoughtful way?

What all teachers have in common, no matter what pedagogical approaches they apply inside their classrooms, is that they have a basic thought of what they expect their students to learn. The majority of teachers make these expectations clear by setting learning goals and/or learning outcomes. In a 'normal' situation teachers will approach students differently while guiding them to reach these learning goals/ outcomes. Some might use forms of technological tools to support the students, others might not. Kolb (2017, p. 29) states that

one of the criticisms of technology use in school learning is that it is an "add on", something that teachers only use *IF* there is extra time or *IF* they want to. Historically, technology-integrated learning has not been considered essential. Many educators have found that they are able to meet the content-specific learning goals without aid of technology.

Although you might question the truth of the beliefs of the non-technology using educators referred to, this is not the argument we will put forward in this article and guidelines. It is important to realize that a form of technology will have to be applied during times when physical, in-class lessons are not possible. Kolb's *Triple E Framework* helps to do so in a thoughtful way.

What is this Triple E Framework?

Kolb (2017) designed the *Triple E Framework* to encourage teachers to think critically about the integration of technology into their lessons and teaching. Kolb (2017, p.30) emphasizes that

technology can and should be adding value to leverage how learning goals are met. The Triple E Framework encourages teachers to look beyond artificial engagement or substitution of traditional tools and consider how technology could push students into a direction that enhances and extends the content-specific learning goals.

In times when teachers have to think about how to continue their education, while adapting to the need to deal with emergency remote teaching, these principles are important in a number of ways.

To start with it helps any teacher, both experienced technology-adapts and novice-technology critics, to think about how learning goals could be met by their students with the use of some sort of technological support. The reality of closed schools and the absence of physical classrooms demands this. Secondly, this frameworks focuses on the learning objectives and not the technology. Thinking about the application of technology by using the framework is therefore accessible to teachers with all kinds of different ideas about education. And thirdly the fundamental idea of enabling students to

progress their learning, is one professionals in education embrace. When circumstances make that some ways of enabling this progression, such as traditional in-class lectures or small group discussions, are impossible the need for technology rises.

The *E's* in the framework stand for engagement (how are students helped to focus on the learning goals and tasks?), enhancement (how are students supported to really understand the learning goals?) and extension (how is classroom learning connected to everyday lives?). These are important foundations for any lesson, but when teaching has to be transferred online the important question arises which technological tools to use in support of these three essential and universal components. Kolb (2017) designed her *Triple E Framework* with these exact questions to mind. Her framework is useful when deciding what technological tools could be and which should not be used. It provides some guidance for these considerations.

Why should you use this Triple E Framework?

Whether they like it or not, or would or would not support the use of technology inside their classrooms under 'normal' circumstances, some forms of technological tools have to be used to provide compulsory education while the schools are closed. This reality forces each and every teacher to (re-)think the way they can provide their teaching the best they can, and what technological tools should be used to do so. But 'just' providing a 50-minute lecture by using Microsoft Teams or Zoom will not do the trick. Neither will just add a Kahoot or Quizlet to your work really help students to understand the subject at hand. Kolb (2019) states that

> effective technology use in learning is rooted in effective instructional strategies for learning.

The thoughtfull use of technology can never be an easy fix. Kolb (2017, p. 88) acknowledges that

> technology tends to extol much time and energy to set up and implement, it should be used carefully and purposefully.

With both of these elements, Kolb shows how important it is to really integrate pedagogical approach and technology if the best support to students is to be delivered. Although the lockdown of schools means every teacher has to make use of some sort of technological tool, they still have a choice to do this well-thought, with the learning goals in mind.

How to use the Triple E Framework?

The *Triple E Framework* focusses on the learning goals teachers set up for their students to achieve or work towards. These are the starting points for thinking of which technological tools to use, not the other way around. After the learning goals have been set teachers can look for technology that might be used, under the circumstances at hand, to guide their students on their learning paths working towards these learning goals. Any technological tool considered should be increasing engagement, help enhancement and

provide extension of the learning process. A sufficient combination of these factors provides the highest level of integration of the pedagogical approach and the technological tool used. Kolb (2017, 2019) designed a measurement tool to measure to what extent the learning is really improved by the use of technology, and therefore whether it makes sense to use the tool or look for other options.

The measurement tool is basicly a set of questions teachers can answer by either 'yes', 'somehow' and 'no'. Each question is formulated to help teachers think about the way their technological tools, or combination of tools, improve engagement by the students, enhance their learning and enable them to extent what they are learning. It is a reflective tool teachers can use to measure whether what they are accomplishing in practice meets their expectations. In the last part of this article, some examples will be presented. For now, let's focus on the set of questions Kolb has made available for general use on her website (Kolb, 2019). Each lesson in which teachers wish, or have to, integrate technological tools should be measured by answering this set of questions. Kolb suggests to always assess the lesson as a whole.

Every time teachers answer a question with a 'no' they should allocate 0 points. When the answer is a 'somehow', 1 point should be allocated. Each 'yes' teachers give as an answer, they should note 2 points. After all questions have been answered, teachers should add the points together and compare the total with the scale Kolb (2017, 2019). Kolb provides the measurement tool on her website. Usage is free.

The questions are:

To what extent does the use of technology:

1. allows students to focus on the assignment or activity with less distraction?
2. motivates students to start their learning process?
3. causes a shift in the behavior of students, where they go from passive learners to active social learners?
4. allows students to develop a more sophisticated understanding of learning goals or content?
5. creates ways to make it easier to understand concepts or ideas?
6. creates paths for students to demonstrate their understanding of the learning goals in a way that they could not do with traditional tools?
7. creates opportunities for students to learn outside of their typical school day?
8. helps to create a bridge between students' school learning and their everyday life experiences?
9. allows students to grow as learners in a lifelong way, so they do not need a school setting to continue to use the tools?

Questions 1 - 3 connects with the amount of engagement the technology provides, questions 4 - 6 give a hint on to which extent enhancement is realised by integrating technology into the lesson or assignment and questions 7 - 9 tell something about the possibilities for extension the technolgy provides. Kolb does not state that all questions should be

answered positively in all situations for technology being thoughtfully applied. Instead she suggests a 'traffic light approach'. When all questions have been rated by assigning 0 points (no), 1 point (somewhat) or 2 points (yes) the total number of points should be compared with this scale (Kolb, 2017, 2019):

If a lesson scores **13-18 points** it is meeting all three components (engagement, enhancement and extension) sufficiently and therefore integrates learning goals, pedagogical approaches, instruction, content and technology in a sensible way. The lesson, with its integration of technological tools, receives a green light. Teachers can continue on this path with confidence.

A score of **7-12 points** means the lesson, as it has been designed at the moment, is not meeting all components, or is not meeting the highest options. There is some connection between the learning goals and the technology used. Teachers might well decide to deliver the lesson the way it has been designed, but are strongly encouraged to re-evaluate the lesson and used technology afterwards to improve the next lesson they provide. This could be seen as a yellow light. Teachers should proceed with caution and critically think about what could be improved.

Every time **6 points or less** are allocated to a lesson, it is best not to deliver the lesson this way, or at least realize that the technology will not improve engagement, enhancement and extension the way teachers might expect to. Because implementing technology in a useful and effective way will require investment of time, this red light must be a warning that other ways of teaching might be more appropriate.

Recent events made teachers realize that there might always be a need to carefully (re-)think what place technology takes in their lessons. Measuring, and evaluating lessons by using the *Triple E Framework* and its acoompanying measurement tool helps to give some guidance on how to teach in a effective and supportive way while their students keep on trying to reach the learning goals teachers have set for them.

Some practical examples

In the previous section a theoretical foundation has been set out. In many cases a series of examples prove to be a useful way to better understand this. In this section we try to explain how the framework and its underpinning beliefs can be applied to design better integrated lessons. The situation for all these examples is the same. Nelson, a history teacher in secondary education, is confronted with the sudden closure of his school. He has to put together a lesson that can be delivered online in four days time. This makes him very nervous since he normally relies on the textbooks the students use in class. Normally he would read a few texts and than explain the content to his students, using pictures and maps he has at hand in his classroom. Since the school has closed he now has to design a lesson to deliver through Microsoft Teams, which he has never used before. On top of this, he is not allowed to come to school and to get his valuable maps. Nelson, sometimes

called teasingly 'Nervous Nelly' by his friends, has to step out of his well-known comfort zone and has to come up with a sensible lesson plan.

Design (case) number 1

Nelson decides to go on the internet and look for some pictures and maps there. He tries to find out how to use the search function in Google by himself and after some time he is able to download a couple of maps and pictures. His plan is avoid meeting the students in an online session on Teams, because he does not feel comfortable with this tool at all. Instead he draws up a digital text document with the following learning goals:

After this lesson students:

- *will be able to tell the difference between capitalism and communism*

- *will be able to notice the difference between a cartoon that is critical and positive about each of these political-economic systems*

After stating these learning goals Nelson draws up an instruction for the students to follow. Here Nelson basically tells his students what to read and what excercises they should do. He includes the maps and pictures he would normally show inside the classroom under these instructions with a short explanation next to it.

Nelson is planning to send this document to all of his students by email and expects them to follow the guidelines and send him their elaborations of the exercises before the end of the day. He plans to send a new document with general feedback, based on the assigments he recieved, to all of his students the day after.

Looking at the Triple E Framework and the measurement tool the following could be concluded. Nelson is using some sort of technology to teach his students. He writes a Word-document, emails this to his students and afterwards do the same with the geberal feedback he provides. Also he is using the internet to find suitable maps and pictures to help him explain the subject-matter to his students.

On engagement Nelsons approach will probably end up with 3 points. Students will receive a very simple-to-follow instructional document. This might help them to focus on this assignment with less distraction (2 points). Nor the document itself, nor the general feedback, will motivate students to start their learning process (0 points). Because Nelson will not explain anything through an (online) lecture students will have to become active, by reading the assigned texts and working on the excercises, if they want to learn anything. Nelson himself, nor the way he has designed his lesson, motivates students to really learn. It will be up to the responsibility of the individual student if they follow the instructions and thereby learn in an active way (1 point).

The design Nelson has chosen does not allow students to develop a more sophisticated understadig of the learning goals and content (0 points). The instructions are basic in nature. The pictures and maps, included by Nelson, only make visual what parts of the texts are about. Nelson has not created a

6

list of important concepts and dates, to help his students to understand the key concepts in the texts to read (0 points). The way students show their understanding of the learning goals is not very different from being in the classroom. Students read (or do not read) their texts and work their way through their excercises and send this to Nelson who combines what he sees into one document with feedback. This last action might not take place when Nelson would see his students in class (1 point). This brings the total point allocated to enhancement at 1 point.

On the extension measurement scale this design by Nelson would score 1 point at most. By providing all of his students with a textdocument with instructions by email and a general document with feedback, he enables them to plan their work themselves during the day Nelson has set as a deadline. Students will be able to work on their own pace following these guidelines and each individual student can decide to which extent he or she takes the provided feedback to heart (1 point). Nelson does not encourage to bridge the gap between school learning and everyday life (0 points). The lesson neither encourages students to develop skills that they can use in their everyday lives (0 points).

Summed up Nelsons design receives a total of 5 points. A red light for his design. He should be advised not to deliver his lesson like this.

For the sake of our example, let us assume that Nelson asks a colleague for advice before he sends his document to his students. This colleague, knowing that Nelson prefers to lecture his students and use examples, pictures and maps to clarify things during these lectures, acknowledges that this is where Nelsons strenght lies. He has to 'meet' his students in order to feel effective as a teacher. This colleague therefore gives Nelson a emergency training in using Microsoft Teams. He also helps Nelson to record a short lecture in which he explains the key concepts about capitalism and communism as a video. His colleague uploads this video to Vimeo for Nelson and instructs Nelson to add the 'private' link to this video to his document with guidance and instructions. Nelson decides that he will send the document a day before the Teams meeting he scheduled with the students. He specifically instructs his students to watch the video and read the texts before the meeting, but not start to work on the excercises until after the online meeting. His plan is to explain the key concepts once more and encourage the students to do their assignment before the end of the day so that he will be able to offer proper general feedback on common misconceptions and mistakes for all students to learn from a day later.

Design (case) number 2

Now Nelson has adjusted and expanded his lesson design. He has include an online meeting and more specific instructions. He also started his journey on introducing a 'flipping the classroom' principle by enabling his students to watch a explanatory video before the online meeting takes place.

On the area of engagement this means an increase from 3 to 4 points (maybe 5 depending on how pursuasive Nelson can be in his video and online meeting to really engage with the content). Students who recieve the

instruction to watch a short video about the key concepts before the meeting might be a little more motivated to start their learning. They will also have the feeling that Nelson is going to meet them online and might test if they watched and understood the content of the video. This might increase their active learning attitude.

Because Nelson makes clear that he will tailor his feedback to what he notices both during the online meeting and in the assignments, he allows the students to reflect on what they need to reach the learning goals. This is one of the elements of higher-order thinking skills and thereby increases the enhancement of learning goals by 1 point. The pre-watchable video also enables the students to easier understand some of the key concepts and ideas. This also adds 1 point in this area. The way students demonstrate their understanding will not change however. Nelson still relies on asking questions during the online meeting and take a close look at what students write down in their assignments. This does not differ from his traditional way applied within the classroom. In this second case though enhancement is increased from 1 point to 3 points by adding a few more interlinked components.

There is no change in regard to the extension component though. The added resources and actions does not offer opportunities to learn outside a typical school, other than allowing students to study at their own pace. This stays 1 point on the scale. The additions Nelson makes do not create a bridge between students' school learning and their everyday life experiences, neither do they allow students to develop skills that they can use in their everyday lives.

The total number of points in this second case would be 8 or 9 points. Nelson now has a yellow light. He could deliver his lesson in this design, but should reflect on the lesson afterwards and see what areas could be tweaked to reach a further integration in the future.

Nelson feels relieved and is pleased with himself. He feels more comfortable now because he thinks he has a design in place that could be succesful and helps him to cope with the fact that he is not able to deliver his lesson through his conservative, but trusted, approach. This is, so feels Nelson, the closest I can come to what I can do. Just when he is about to prepare an email to his students in which he will send the instructions and the link to the video, the colleague who helped him out calls him to tell Nelson he has 'some ideas that might improve Nelsons lesson even further'. Nelson sits down and listens to his colleagues plan.

Design (case) number 3

Nelsons colleague proposes a additional assignment. After the students have watched the video and read the texts Nelson should instruct them to set up a database with pictures that provides proof of which political-economic system is dominant in the country the students live in. Nelson instructs them to first draw up a list of characteristics of both capitalism and communism. This has to be done in pairs, using whatever social medium the students choose. Normally the students would be asked to go out in pairs and make pictures

with themselves standing in front of several stores (for example) to show that prices can be different, and thereby offering proof of a capitalist system, but due to the lockdown rules they might not be able to go out together. If this is allowed, this might be preferred because it will definitely allocate 2 points to both the motivation and the active learning component of the measurement tool. If students are not allowed to go out in pairs Nelson might include an instruction on using the streetlevel function in Google Earth to scaffold for pictures proving the same.

Nelsons colleague also advises Nelson to tell the students that a few of them might be invited during the online meeting to share their photos (by screensharing) and explain what characteristics of which economic system are visable in the picture. Finally Nelsons colleague offers to upload the flipped classroom video into Edpuzzle, where questions can be integrated with the video. Students will have to answer these questions before the video continues. Nelson can see which students have watched the video and what answers they have given. He can use this information to give specific attention to frequently made errors during the online meeting.

These adjustments will have an impact on all three of the components of the measurement tool. The engagement increases from 4 or 5 points in case 2 to 6 points. Students still receive clear instructions, but also know that something will be expected from them when they come to 'online' class. The extra assignment of relating theoretical knowledge from both the video and the texts provided to practical examples of understanding might make the key concepts less abstract. Also the questions in the Edpuzzle video encourages students to celebrate their success when they see they have understood the fragment the question is about.

As for enhancement, the questions asked in Edpuzzle combined with the assignment to come up with either reallife pictures or streetview screenshots from Google Earth, increase the understanding of investigating skills (stays 1 point), creates support to make it easier to understand the concepts (increases to 2 points) and offers students two new ways of demonstrating their understanding of the learning goals (increases to 2 points).

Because the students are challenged to look for photos that proof the existence of the correct political-economic system in the world the students live in, this addition alone increases the points on all components. The technology (making pictures or using Google Earth and upload these with the correct explanation justifies 2 points on the opportunity to learn outside of a typical schoolday. It also creates a bridge between the concepts learned in class and the experiences of everyday life, although this might be improved even further (for example by expanding the challenge to find pictures in Google Earth that proves that there are countries with another political-economic system than the one the students lives in). For now 1 point will be allocated to this component. Net searching skills, like looking for pictures and online presentation of pictures with explanation, are essential skills in the 21st century skills. Because not all of the students will be invited to do so during the online meeting 1 point will be allocated here.

This brings Nelson to 15 points. With some guidance and help from his colleague he was able to learn in a spectacular way himself and design a

well-thought and integrated approach for this lesson. And by this learning he himself once again (re-)positioned himself as a role model and example for his students, of which many might be struggling to cope with the changing circumstances as well. A great achievement for Nelson and a farewell to 'Nervous Nelly'.

Further reading/ references

Do you want to deepen your knowledge on this topic in education? Please consider the following sources to study.

Kolb, L. (2017) *Learning First, Technology Second; The Educator's Guide to Designing Authentic Lessons*, Portland/ Arlington (United States), International Society for Technology in Education.

Kolb, L. (2019) *Triple E Framework* [Online]. Available at https://www.tripleeframework.com (Accessed 13 June 2020).