Best Practice: Interactive Didactics and Augmented Self Reality

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Abstract

After studying vast amounts of research outcomes Dylan Wiliam (1998; 2009; 2011) concludes that "teacher quality is the major determinant of how much progress students make". According to him interactive didactics in the form of formative assessment is a very powerful element to improve teacher quality.
Beata Staszyńska and Onno Hansen (2016) found in five European projects and three Polish national projects that adding technology to interactive didactics has a serious advantage over just introducing interactive didactics. Technology can add the following effects to interactive didactics:

- *Students engage more and open up more;*
- *Two minutes' emotional highs can be triggered leading to "flow";*
- *Visual information can be transferred leading to higher engagement, longer concentration spans and better tests results.*

The technology Staszyńska and Hansen tested out in educational settings mainly is Augmented Self Reality serious games. Whereas "Augmented Reality (AR) consists of a real-time video stream generated by a camera to which digital elements are added that appear in reaction to a predefined trigger", Augmented Self Reality is a kind of Augmented Reality in which "the presence of the viewer on the screen is the essential feature ... It feels like it is us who are being augmented". The serious games by Staszyńska and Hansen are in essence interactive multiple-choice questionnaires.
As was found by Staszyńska and Hansen (2016) during their projects the Augmented Self Reality games are adding to interactive didactics in ways that were described above:

- *90% of the students are engaged by a game for around twenty minutes – a majority of them opens up during the game;*
- *Answering questions takes no longer than 2 minutes – the resulting augmentations provide emotional highs that lead to a situation of "flow" that lasts throughout the duration of the game;*
- *Augmentations, being visual digital elements, lead to higher engagement and longer concentration spans;*
- *The games are not yet tested for their effects on tests results.*

1. Introduction

After studying vast amounts of research outcomes Dylan Wiliam (1998; 2009; 2011) concludes that "teacher quality is the major determinant of how much progress students make". According to him interactive didactics in the form of formative assessment (also named: assessment for learning/ AfL) is a very powerful element to improve teacher quality. He concludes: "if you are serious about raising student achievement then you have to be focusing on AfL, and if you are not focusing on AfL you are probably not serious about raising student achievement." Together with Paul Black Wiliam dismisses the traditional transmission didactic model. Black and Wiliam (1998) claim that there is a "wealth of evidence that this transmission model does not work, even by its own criteria". According to them in the transmission model "there is little, or no, worthwhile learning".
Education innovators Beata Staszyńska (Citizen Project Foundation) and Onno Hansen (Ezzev Foundation) stumbled upon a similar conclusion in their first European project, CDEI. In the project they found that a serious education game they had developed only triggered extreme openness under youngsters (aged 8-14) when combined with a form of interactive didactics. When combined with traditional transmission model didactics no significant effects occurred (Staszyńska/ Hansen, 2015). For them this finding was the trigger to expand their work from technology driven to interactive didactics driven technology innovations.

2. Interactive didactics cum technology

Adding technology to interactive didactics has a serious advantage over just introducing interactive didactics: technology has the effect of engaging and opening up individuals. This effect of technology

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on youngsters is extensively discussed by Sherry Turkle (2011). As early as the mid-1970s the effect was noted and dubbed “the ELIZA effect”. The effect was named after Joseph Weizenbaum’s software program ELIZA “that engaged in dialogue in the style of a psychoterapist.” The program did not understand anything it was told, it just would “take strings of words and turn them into questions or restate them as interpretations”. Turkle continues: “Weizenbaum’s students knew that the program did not know or understand; nevertheless they wanted to chat with it. More than this, they wanted to be alone with it. They wanted to tell it their secrets.”

This effect was confirmed by Staszyńska and Hansen’s research. They asked youngsters (aged 11-18) in questionnaires what they would need to open to adults and what they would need to open up online. The question regarding adults triggered long individual lists of requirements, often involving a guarantee that the young individual would not be punished, would be respected by the adult, that non-hierarchical communication would take place and that the choice of topics would be common. In order to open up online all participants indicated that they would just need an Internet connection and a relevant app (Staszyńska/ Hansen, 2015).

The effect was further demonstrated by Staszyńska and Hansen in class rooms when playing a serious Augmented Reality game on online identity and data sharing during the CDEI project. Touching sensitive subjects like online friendships and online love among students aged 10 to 14 they found that students invariably open up and approach these subjects honestly. Occasionally students would open up to an astonishing level. During one pilot lesson in the Netherlands for instance students (aged 12) started talking about their sexual fantasies and sexually oriented online activities. In another lesson a Dutch girl (aged 11) stated that she does not meet up with strangers whom she had gotten to know online any more (Staszyńska/ Hansen, 2015).

At the basis of this effect probably lies a preference Staszyńska and Hansen found among many youngsters: a preference for asynchronous contact over synchronous contact. According to these youngsters they experience barriers in real life that they do not experience while chatting or SMS-ing. These barriers are caused by the immediate nature of contact in real life. In an offline setting immediate answers are expected on questions or as a result of occurring events. Many youngsters feel put under pressure by this. They feel that in this liquid world (Bauman, 2004, 2005, 2007) they are constantly forced to react, with little space for taking individual control. When chatting or SMS-ing, on the other hand, youngsters feel that they themselves can choose when to react. They feel that asynchronous communication allows them time to edit and to interrupt their communication when they feel like it. Note that this advantage of asynchronous communication was foreseen by Joseph Walter in 1996 [1].

A second effect of enhancing interactive didactics by technology is that it enables the didactics to fit better to a major characteristic of current youngsters: fragmentation. Staszyńska and Hansen (2016) even dubbed the current generation of students aged 6 to 18 “Generation F” (“Generation Fragmentation”). This fragmentation is caused by youngster multitasking, by media, social media, politics, parents, educators and by their peers.

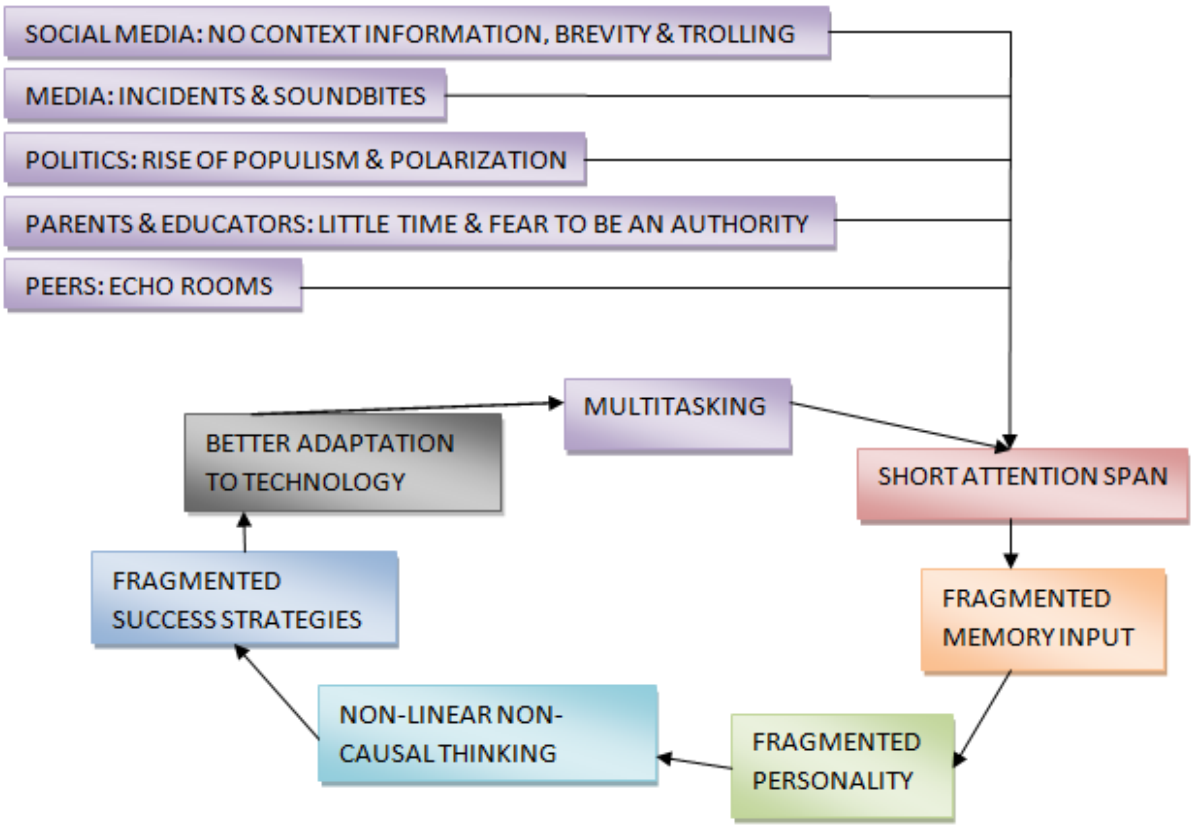

Figure 1: Circle of fragmentation (Adapted from: Staszyńska and Hansen, 2016)

This fragmentation causes youngsters to have very short attention spans – when on their own around two minutes (Rosen, 2013). Games for instance play into this by offering players at least every two minutes an opportunity to achieve a satisfying mini-result that causes "fiero": an emotional high (McGonigal, 2011).
Interactive didactics by themselves are also capable to play into the short attention spans but this requires a major effort by the teachers (unpublished result from the E-LAB dt project by Staszyńska and Hansen, 2016). Technology can provide teachers with a frame to alleviate teacher effort, for instance by means of online quizzes.
The end result of presenting students with "fiero" by means of interactive didactics and technology ideally is a situation of "flow", as often experienced in gaming. "Flow" is a situation in which "individuals [become] completely absorbed in the activities in which they are engaged" (Wiliam, 2011). Mihaly Czikszentmihalyi, the originator of the concept, describes "flow" as: "the satisfying, exhilarating feeling of creative accomplishment and heightened functioning" (quoted in McGonigal, 2011).
A third effect of interactive didactics cum technology is that the information transferred is often visual, which leads to higher class engagement, longer concentration spans and higher tests results. An example of this is a recent study that showed that students watching Youtube videos instead of reading text books on physics achieved 10% higher exams results [2]. The effect was consistently found by Staszyńska and Hansen in their education projects.
In summary, technology can add the following effects to interactive didactics:

- Students engage more and open up more;
- Two minutes' emotional highs leading to "flow" can be triggered without too much effort;
- Resulting visual information leads to higher engagement, longer concentration spans and better tests results.

3. Augmented Self Reality games

The technology Staszyńska and Hansen have tested out most in educational settings is Augmented Reality in the form of Augmented Self Reality serious educational games. Whereas "Augmented Reality (AR) consists of a real-time video stream generated by a camera to which digital elements are added that appear in reaction to a predefined trigger" [3], Augmented Self Reality is a kind of Augmented Reality in which "the presence of the viewer on the screen is the essential feature... it is a

very promising playground in which we ourselves are the trigger; we ourselves are the point of interest. It feels like it is us who are being augmented, even though the augmentation most often takes place by a marker that we hold in our hands. In analogy to Augmented World Reality augmentation we can say that this type of AR enhances our understanding of ourselves and tries to arouse interest in ourselves" [4].
The educational serious games by Staszyńska and Hansen are in essence interactive multiple-choice questionnaires. They engage students as a group by providing them with questions to answer. The questions are physically answered by a chosen group representative who sits in front of a webcam. This representative shows a marker symbolizing an answer option as chosen by the group (A, B, C or D) after which the game responds by showing a customized visual (and sound) effect (augmentation) on the webcam stream. The webcam stream is shown both on a computer and on a big screen that is visible for the whole group.
Hansen describes how to combine the games and interactive didactics [5].
Staszyńska and Hansen developed the following games:

- On online data sharing and online identities [6. 7];
- On profiling [8];
- On didactics [9];
- On emotions online [10];
- On the importance of sports [11].

Important game effects as found by Staszyńska and Hansen are:

- 90% of the students are engaged by a game for around twenty minutes – a majority of them opens up during the game;
- Answering questions takes no longer than 2 minutes – the resulting augmentations provide emotional highs that lead to a situation of "flow" that lasts throughout the duration of the game;
- Augmentations, being visual digital elements, lead to higher engagement and longer concentration spans;
- The games are not yet tested for their effects on tests results.

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