What's wrong with the feedback?

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ABSTRACT

It has already been for a while that educational institutions and researchers tried to find an answer to the recurrent critics of learners on how feedback is delivered. Many emerging technologies have been used with a limited success, therefore there must be some other factors. What we learned from observing different feedback was that written feedback is not very attractive. Most of the feedback was not enjoyable to consult or difficult to access. This research proposes an answer to how to make feedback more appealing, especially when artefacts are submitted, and formulate some recommendations to develop an effective feedback tool. This research is not aiming for feedback on written reports where tools such as Turnitin are sufficient.

Keywords

Higher Education, feedback, marking, video feedback, recorded feedback, visualization.

1. INTRODUCTION

Marking and feedback are released to learners at the same moment. The feedback is corresponding to the mark. Learners will go through a process where they first identify the score and secondly try to figure out what justify that score. This justification must be supported by the feedback. Substantively most given feedback meets the justification criteria as the feedback is provided by professionals in their field.

Early research in 2004 at the University of Wolverhampton [1] indicates that students even don't collect their assessed work. Other research done by Wojtas in 1998 [2] shows that the students have little interest in their feedback. They only consult the feedback if the mark is not confirming their expectations. So, this is not a new problem Higher Education is dealing with.

In fact, this study was also developed from the frustration of tutors that students were not engaged with their assignment feedback, the same motive as researchers of the University of Wolverhampton had in the past [2]. However, our approach will be quite different. The aim of our research is to meet demands of tutors and students on feedback for artefacts. Tutors mentioned they spend a lot of time to provide the feedback (a lot of recurring work) and students don't feel to be attracted to consult the feedback.

The aim of this research is to create a prototype to develop a feedback and marking tool which meets the following requirements.

Reduce the workload for the feedback providers.

- Time saving.
- Excellent usability.
- Freedom.
- Availability of creative tools.
- Integration in existing VLRs.

Visualize feedback in a more attractive way for learners.

- Attractive presentation.
- Perception of easy processing.
- Clear correlation.
- Structured.
- Neat.

This research won't consider the actual content of the feedback but how it is presented to the learner. Four prototypes have been setup, discussed and tested to formulate recommendations to use in the development of a common marking and feedback tool. Note that as output for the feedback and marking will be an output on a screen (digital). So, new technologies (video, audio, interactivity) can be also implemented later.

2. PREVIOUS RESEARCH

Various research was conducted on feedback and marking in higher education. Many of them were focused on the improvement of the actual content of the feedback. Less seems to be interested in how the feedback could be presented in a more attractive way to the learner.

In 2016 The Higher Education Academy presented a Framework for transforming Assessment in Higher Education [3]. This research is focused on a better integration of feedback in the assessment process, which is absolute a necessity, but again not covering how feedback can be presented in a more visual, attractive way to learners. Concept mapping, mind mapping and argument mapping are techniques now used for education-related purposes [4]. In fact, this is a visualization of an analysis of different part of an assignment setup so the use of visualization is not a novelty in Higher Education.

Feedback is very important as a learning tool that guides students' progress and the need for improvement on their performance. It has a scaffolding function, as it may enable students to further develop their performance level. As said before, research on assessment feedback has been essentially focused on ways to improve the quality of written based documents, whether for summative or formative assessment, and independently of being driven by a more developmental dimension, an encouraging or fairness one. Seven principles of good feedback practice were identified by Nicol and Macfarlane-Dick [5], aiming to facilitate the students' self-regulation of their own performance, in terms of their thinking, motivation and behaviour during the learning process. The 3rd principle, about delivering high quality information to students about their learning, has been more and more reflected on the UK NSS surveys. Curiously, this principle focuses on the quality of the content and has no mention to the quality of the way feedback is delivered or presented to students. However, for the feedback to be useful to students, they must understand the feedback first, as pointed out by Lizzio and Wilson [6], alluding to a potential discrepancy between the meaning of academic's feedback and its interpretation by students. This difficulty, commonly felt by students, in understanding written comments, which are usually vague and in an imposing style, was also referred by Duncan [7], who highlighted that a "clear advice on how to improve the quality in subsequent work" was often neglected in feedback sheets. Understanding how students make sense of feedback and how they use it to support their learning process, has also been object of research (Higgins et al. [8]; Hepplestone and Chikawa 2014 [9]; Pitt and Norton [10]).

Per Nicol [11] "the quality of the students' interaction" with the feedback comments is as important as (or maybe even more important than) the quality of the comments they receive. Surprisingly enough, being this interactive characteristic considered so important, no examples were found of the use of interactive capabilities, offered by new technologies and devices, applied to the assessment feedback process.

The use of audio to provide feedback have been widely discussed and became an available option, usually, as discussed by Savin-Baden [12], who suggests the use of podcasting to deliver feedback, within a dialogic learning framework, because students seem to like it, although it does not necessarily improve grades, and despite staff tending to show some resistance, considering it more time-consuming. Lunt and Currant [13] also discuss the introduction of audio feedback, delivered to students via a VLE or email, with very positive results, showing that students are at least 10 times more likely to open audio files compared to collecting written feedback. Hussey and Smith [14] refer to an innovative solution that provides audio feedback which can be accessed by students with a simple digital audio player.

3. RESEARCH METHODOLOGY

The initial plan was to set up several test cases covering one or both proposed requirements. To create the prototypes two techniques were used

- Rapid Application Development (RAD)
- Template

As RAD the FileMaker platform was used which is a standout leader for Rapid Application Development [15]. Despite it is a great software it still has some restrictions in the creative areas. But nevertheless, it's good to have some insight in this kind of software to figure out if it can be used to develop the final tool. To have completely free hand in creativity Adobe Illustrator was chosen to create the templates. Using templates had the disadvantage that there was no database connection resulting in the template based prototypes totals of the marks were done manually which must be taken in account that this won't be the case in the final tool.

When our brains perceive information, they catalogue how easy it is to process the available data. This can make the difference that a learner will be focused on the feedback or not. Young learners have a lot of distractions those days and want to catch information in a snap. *Figure 1* shows us what the two main issues are, gaining interst and keeping that interest.

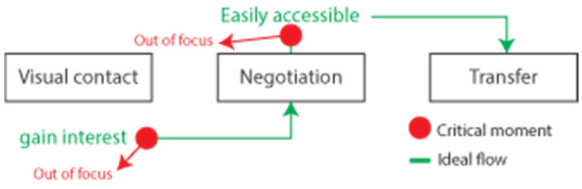

Figure 1: Visualization of the fragile perception

This research is focused on delivering feedback for Artefacts. In our department, this could be used by units teaching creative assets and programming. The covered topics by the different prototypes were:

- Software programming.
- Texturing and lighting for games.
- Animation for games.
- Programming for Graphics and Games.

The first prototype was created to formulate an answer to the growing concern about the workload feedback providers had. A programming unit, Software Programming, was used as a test case. To develop the prototype a RAD was used. In the past, there were complaints from learners that the provided feedback was a copy/paste work. This is not the way to gain confidence from the learners and it will reduce the value of the proposed feedback. The developed prototype allowed to adjust predefined sentences when they were used as feedback. Beyond, there was a nice overview of the learning outcomes combined with their appropriate values and scores. *Figure 2* shows the setup of the prototype.

A second prototype was used for feedback on a texturing assignment which is a good example of an artefact submission. Knowledge from graphic design and the advertisement world [16] was implemented. At the same moment, it looks very structured and polished. Basic idea behind the setup was that creative students are not keen to read textual feedback and have a more visual focus. This is template based solution.

Colours played also an essential role in the prototype. From our daily lives, we know green is **GO**, orange is **TAKE ATTENTION** and red is **DANGER**. The combination of those colours was used to indicate the level of quality of the delivered work. Colour was applied on text and arrows. *Figure 3* is showing a first implementation.

Notice the use of arrows as a visual guidance, the large numbers of screenshots from the students work and the application of some rules used in the advertisement world.

MARKING SOFTWARE PROGRAMMING 2015 - 2016

Student Name [redacted] Student Group [redacted] Student ID [redacted] **55.30**

Analysis - 20% **100**

		Remarks
Analysis Problem	60	
Analysis IPO	40	- The analysis is well done.
Analysis Diagram	35	- Using separate modules use a function for each module is well done.
Analysis CPO	55	- You could use also diagrams for the analysis. - An IPO overview should be convienent.
Total Analysis	47.50	/100

Design - 30%

		Remarks
Module design	60	
Design techniques	55	- You have a lot of diagrams some are not visible but most important once are there.
Module IPO	45	- There are 3 functions now, You could have split up everything in more different functions.
Detailed diagram	65	- Structs are used for card and hand which is good.
Total Design	56.25	/100

Implementation - 50%

		Remarks
Modularity	60	
Programming style	60	- The actual game play is all right but there is problem executing the loops in the right way.
Strategy results	65	- Invalid value at bet (character instead of number) will end in a infinite loop.
Discussion - Concl.	50	- UI of play is very basic, could be more user friendly, clear.
System requirem.	50	- You have to enter each time to move on in the game but it is not mentioned anywhere.
Underst. principles	60	- Ace High or low, here is a fall back but also not mentioned at the beginning which key has to be used.
Underst. techn. iss.	60	- There is a running Execute which is good. - Try to use other references, for example C++ books, decent learning video tutorials.
Total Implement.	57.86	/100

Figure 2: Structured feedback for each of the learning outcomes. Remarks are predefined but can be adjusted.

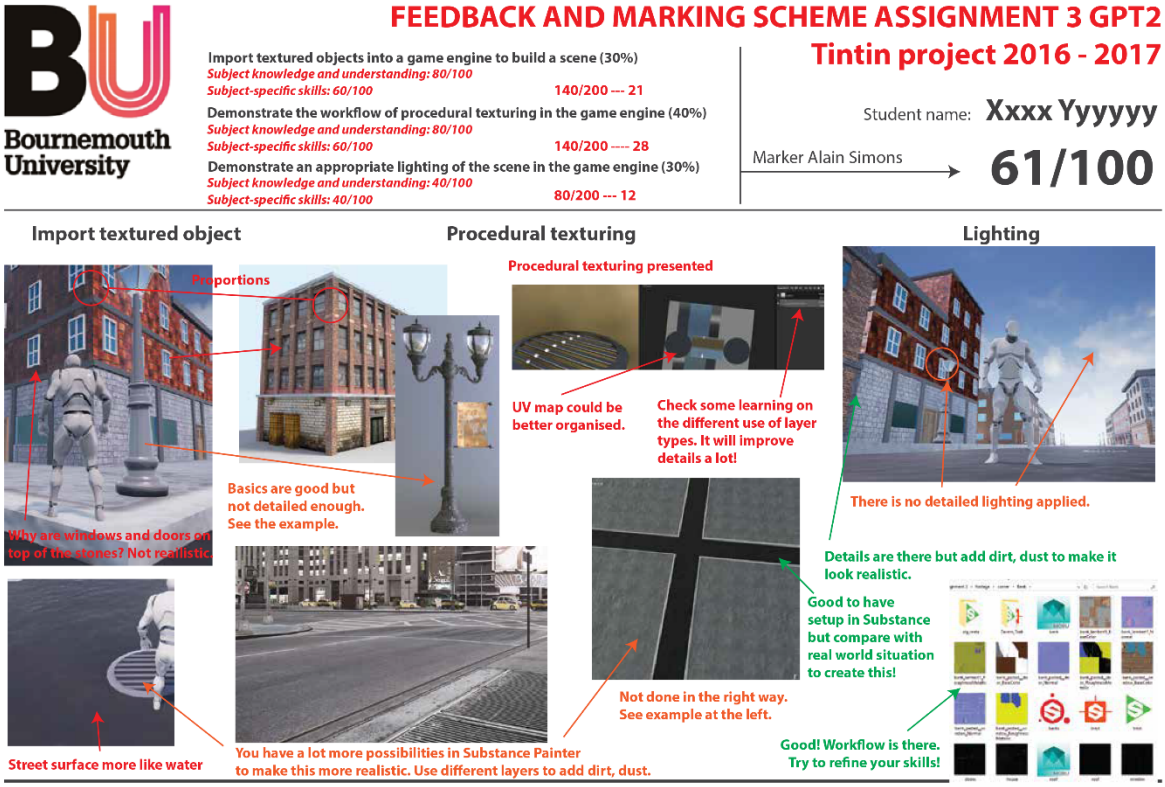

Figure 3: Knowledge from graphic design and the advertisement world was implemented in prototype 2.

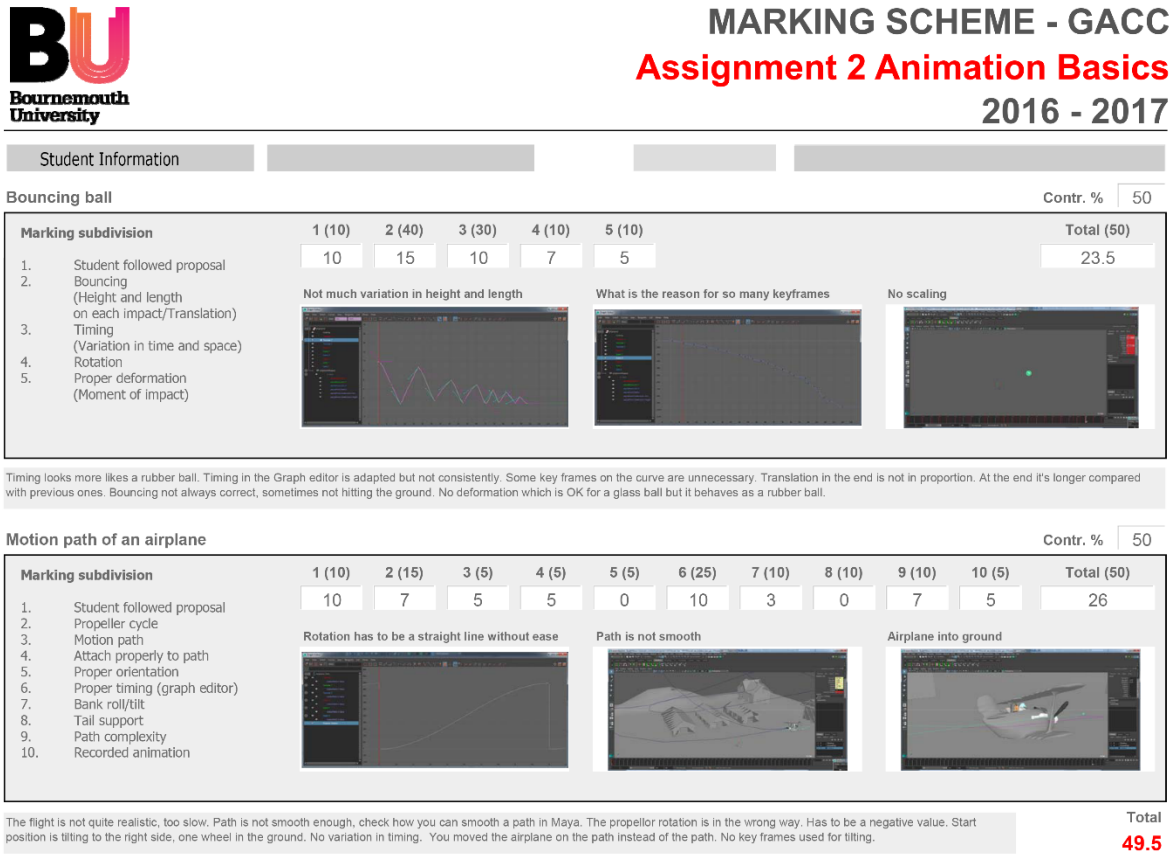

Figure 4: Prototype 3 is a solution for an animation assignment. The small images were not a great success.

Figure 5 shows the areas of importance to place our data. For our prototype, title, marks, learning outcomes and a part of the visualization are situated in the high interest area part. There's also a brand identity included in this example by using the logo of Bournemouth University in quite a large size.

Notice also that all prototypes have a landscape orientation and an aspect ratio of 16:9 and are perfect viewable on HD screens.
All prototypes were exported in the same way. A high-quality pdf was generated which could easily been shown full screen.
The third prototype was created to give feedback on an animation unit and the goal was to combine the positive elements from both previous prototypes. Feedback on animation is more complex compared to texturing. The assignment covered the use of curves and their influence on the behaviour of the animation. Once again a RAD solution was used. Notice that the characteristics of advertising rules were still more or less implemented but in a less efficient way. The marking and the demands related to the learning outcomes plays a larger part here. There was no spontaneously approval from the learners.

Prototype 3 showed the feedback providers that it's not always easy to define what is a 6 or 7 as a mark. There is a grey area which can cause discussions with students "why a 6 and not a 7". To avoid that kind of discussions prototype 4 had been adjusted to a more

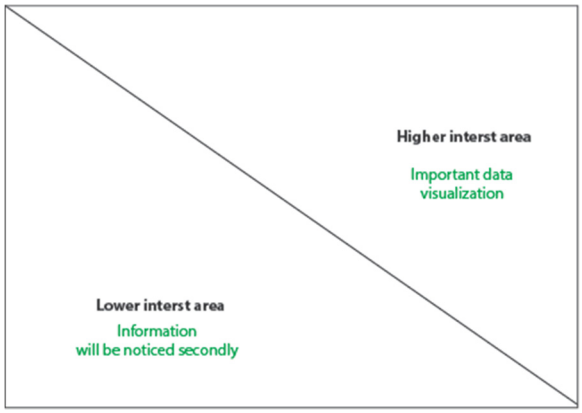

Figure 5: Visual presentation of the lower and higher interest areas.

verbal judgment for the marking but strong related to the learning outcomes. The conclusion area changed position to a more important area.

4. RESULTS

Results from the feedback provider perspective
It may be no doubt that the RAD solutions were faster to generate feedback. Features as drop-down lists to select predefined feedback and the ability to do calculations made it more user friendly compared to the template based solutions. The predefined feedback

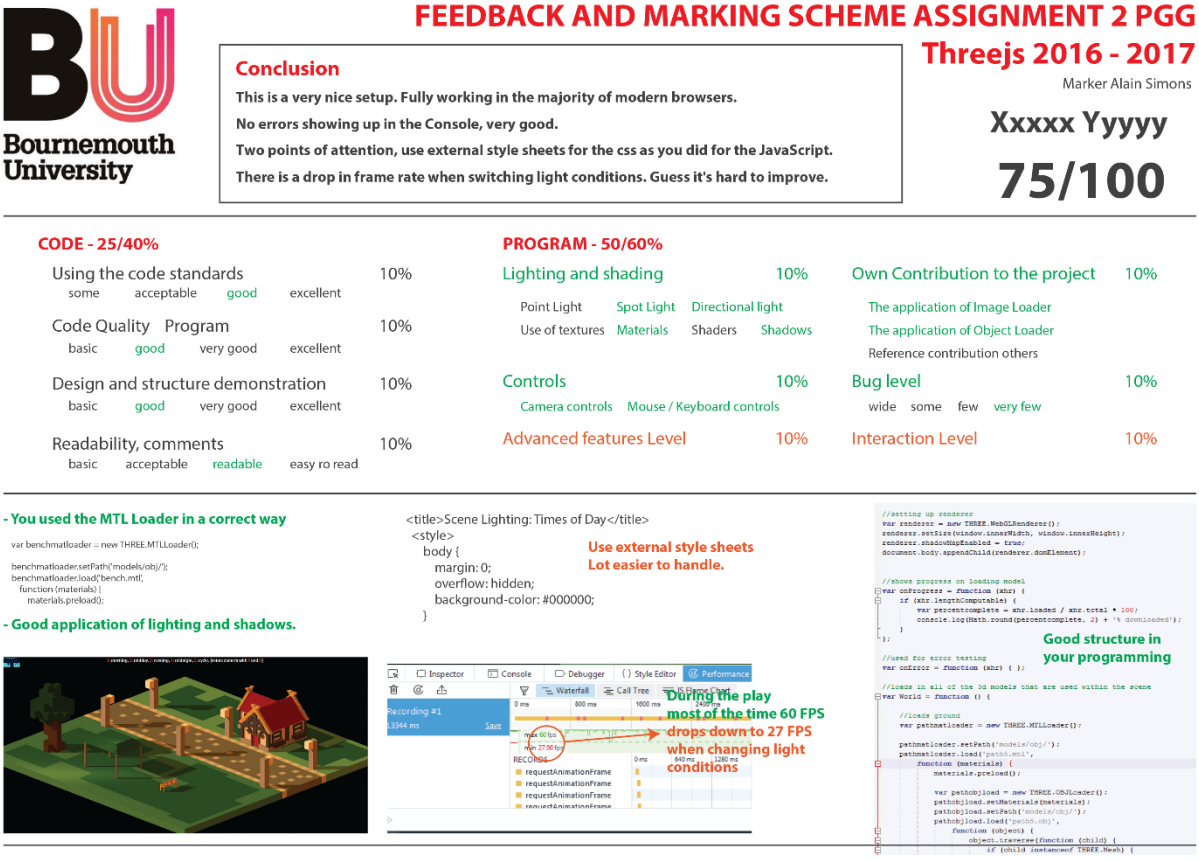

Figure 6: Prototype 4, the learning outcomes and related marks are now more prominent present.

Table 1: From the feedback provider perspective
The achievements of the different prototypes. All requirements need to be fulfilled to be succesful

	Time saving	Excellent usability	Freedom	Creative	Integration	Used Feedback for
Prototype 1	X	X				**Programming software**
Prototype 2			X	X		**Texturing**
Prototype 3	X	X				**Animation**
Prototype 4			X	X		**Programming Graphics**

was also adaptable which made that the given feedback could be easy personalized. On the other hand, it restricted the creation of a more "creative" feedback.

Results from the leaner perspective

Take in account that during the testing phase of the prototypes learners were not informed that a research was going on. Instead of using surveys we waited for a response from the learner side. We didn't trigger anything, the appreciation had to come by itself, for us the only way to be certain they could appreciate the used method. Perhaps a weird approach to get a feedback from the learners but if it was appreciated it should come up during the student forums spontaneously.

After the release of the feedback and marks it was waiting for a response from the learners through the student forums. After the release of the texturing assignment the feedback came without any demand of our part. Spontaneous the learners indicated that they liked the way the feedback was provided. Something similar happened after the release of the PGG marks. The visual approach was successful for both the creative and programming assignments. Prototype 1 and 3 didn't deliver a spontaneous feedback from the learners. There was space for improvements in some areas of the content but it seems to be overshadowed by the visual presentation of the feedback. In a way, it delivers the proof that the package is more important than the actual content. From an academic view that can be argued but it's a fact that decent visualization gets more learners involved in the feedback and marking, especially learners who otherwise wouldn't have consult their feedback. Prototype 2 and 3 succeeded in gaining the attention of the learner.

It was clear that the biggest impact was on the artefact and programming assignments. The software and animation feedback was great in presenting the link between the ILOs and the marks but still looks to dull to make students enthusiastic. A wrong approach to visualize the graphs (difficult to read, too small) on the animation feedback taught us that the visualization of

Table 2: From the learner perspective
The achievements of the different prototypes. All requirements need to be fulfilled to be succesful

	Attractive	Ease	Correlation	Structure	Neat	Used Feedback for
Prototype 1			X	X	X	**Programming software**
Prototype 2	X	X	X	X	X	**Texturing**
Prototype 3		X	X	X		**Animation**
Prototype 4	X	X	X	X	X	**Programming Graphics**

the feedback must be done in a perfect way if it wants to have some impact.

5. FUTURE DEVELOPMENTS

To provide software which will allow the system to store the data needed to generate the correct output whilst at the same remaining as non-invasive as possible to the user, some further developments are planned.

The first aim is to tightly integrate the software with the operating system itself so that it can become part of the work review process that the marker goes through. For example, if at any point the marker decides to make a comment, they can press a known hot-key and rather than any software loading and distracting from their original train of thought, simply the task they want to perform will appear, such as highlighting a piece of work and adding a comment box. This should mean that no windows will pop up, breaking the flow of marking.

The second aim is to provide the user with an easy and obvious way to upload the final marked items to a server. Opening web browsers and navigating web interfaces often causes large breaks in workflow when the marked work is all ready and waiting on the user's machine. For this we will be looking in to potential ways that the marked work can be selected and committed in a similar way to existing GUI version control software such as Tortoise SVN. This also means that plugins could be written to connect the software to a variety of Virtual Learning Environments (VLEs) in a common and uniform manner requiring little training when joining a new institution.

A final aim is to ensure the software is fast and easy to set up and portable to a variety of platforms that instructors must use such as not only Windows but also Mac OS X, Linux and FreeBSD. This ensures that work can be marked on the systems it was intended for such as MAX MSP on Mac OS X, Maya on Linux etc. For this reason, we intend to write the software using the C++ language and a portable GUI toolkit such as wxWidgets.

6. CONCLUSIONS

Our research proved that a good visualization of feedback will help students to get more interested, more engaged in the marking and feedback of their assessed work. Previous research already proved that feedback is a very important part of the learning process and that it deserves all appropriate attention. This research was an attempt to focus as learning specialists not only on the content of the feedback but more specific on how it is presented to learners. The prototypes can be presented on a wide range of screens such as for mobile phones, tablets and computers. Prototypes 2 and 4 were the most effective. Based on these two a final prototype will be developed which can be used as a blueprint to create a feedback and marking tool. Video and audio must be integrated in this setup so that they are not a standalone solution anymore to provide feedback. To be affective it's much better they are integrated in a feedback solution. As mentioned in future developments chapter the lay-out of the feedback provider will be the same as the one shown to the learner, a kind of scrapbook were the feedback provider can stick his comments. Research on RAD solutions (prototype 1 and 3) showed us that it's hard to use such a solution to meet all mentioned requirements to satisfy learners and feedback providers. Usability (feedback provider) and attractive (learner) will be the keywords when developing a blueprint for a feedback and marking tool.

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