

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

Usually marking and feedback are released to learners at the same moment. The feedback summarizes the pros, cons and advice to improve the delivered work. Substantively most given feedback meets the justification criteria as the feedback is provided by professionals in their field. Interested learners will go through a process where they first identify the score and secondly try to figure out what justify that score. Non-interested learners will ignore the feedback.

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] as well shows that the students have little interest in their feedback. They only consult the feedback if the mark is not confirming their expectations. Being still confronted in 2017 with the same problems discussed in 2004 (despite many attempts were undertaken over the years to improve the situation) indicates that the problems persist. Within our own department tutors were even confronted in a harder way due the large amount of creative assessments (artefacts).

Therefore, the main aim of our research is to meet demands of tutors and students on feedback for artefacts. Tutors mentioned they spent a lot of time to provide the feedback (a lot of recurring work) and students didn't feel to be attracted to consult the feedback.

Summarized this research is going to create and discuss different prototypes 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 interest and keeping that interest.

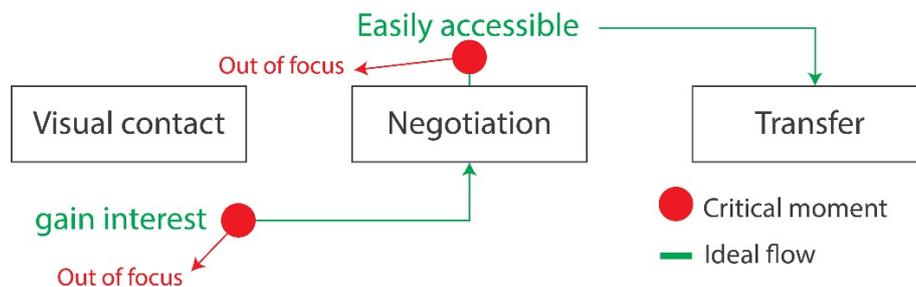


Figure 1. Visualization of the fragile perception

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 (Rapid Application Development) tool was used. Whilst this offered quick iteration times during development which were crucial in receiving initial test results, it quickly proved to be inflexible once requirements evolved from these initial results. 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.

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 convenient.
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.
Total Implement.	57.86	/100

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

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.

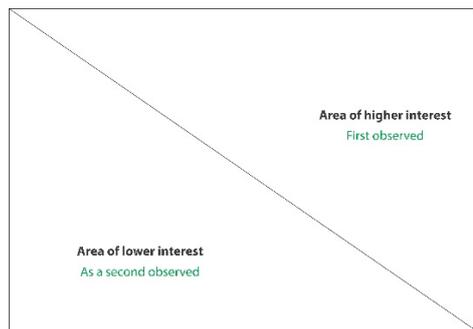


Figure 3. Visual representation of the lower and higher interest areas.

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. *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.



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FEEDBACK AND MARKING SCHEME ASSIGNMENT 3 GPT2
Tintin project 2016 - 2017

Student name: **Xxxx Yyyyyy**
 Marker Alain Simons → **61/100**

<p>Import textured object</p> <p>Import textured objects into a game engine to build a scene (30%) <small>Subject knowledge and understanding: 80/100 Subject-specific skills: 60/100</small></p> <p>140/200 --- 21</p> <p>Demonstrate the workflow of procedural texturing in the game engine (40%) <small>Subject knowledge and understanding: 80/100 Subject-specific skills: 60/100</small></p> <p>140/200 --- 28</p> <p>Demonstrate an appropriate lighting of the scene in the game engine (30%) <small>Subject knowledge and understanding: 40/100 Subject-specific skills: 40/100</small></p> <p>80/200 --- 12</p>	<p>Procedural texturing</p> <p>Procedural texturing presented</p> <p>UV map could be better organised.</p> <p>Check some learning on the different use of layer types. It will improve details a lot!</p> <p>Not done in the right way. See example at the left.</p>	<p>Lighting</p> <p>There is no detailed lighting applied.</p> <p>Details are there but add dirt, dust to make it look realistic.</p> <p>Good to have setup in Substance but compare with real world situation to create this!</p> <p>Good! Workflow is there. Try to refine your skills!</p>
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Conclusion
 The basics of texturing and workflow are covered in this submission. You know how texturing can be done. Only there is lack of interpretation of real world situations and bringing this to a virtual world like a game engine. BTW the buildings in the comic were higher, other kind. This work can be improved with some artistic input and spending more time.

Figure 4. Knowledge from graphic design and the advertisement world was implemented in prototype 2.

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

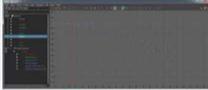
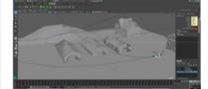
Student Information												
Bouncing ball											Contr. %	50
Marking subdivision											Total (60)	
	1 (10)	2 (40)	3 (30)	4 (10)	5 (10)						23.5	
1.	Student followed proposal										10	
2.	Bouncing (Height and length on each impact/Translation)										15	
3.	Timing (Variation in time and space)										10	
4.	Rotation										7	
5.	Proper deformation (Moment of impact)										5	
<div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Not much variation in height and length</p>  </div> <div style="width: 30%;"> <p>What is the reason for so many keyframes</p>  </div> <div style="width: 30%;"> <p>No scaling</p>  </div> </div>												
<small>Timing looks more like a rubber ball. Timing in the Graph editor is adapted but not consistently. Some key frames on the curve are unnecessary. Translation in the end is not in proportion. At the end it's longer compared with previous ones. Bouncing not always correct, sometimes not hitting the ground. No deformation which is OK for a glass ball but it behaves as a rubber ball.</small>												
Motion path of an airplane											Contr. %	50
Marking subdivision											Total (60)	
	1 (10)	2 (15)	3 (5)	4 (5)	5 (5)	6 (25)	7 (10)	8 (10)	9 (10)	10 (5)	26	
1.	Student followed proposal										10	
2.	Propeller cycle										7	
3.	Motion path										5	
4.	Attach properly to path										5	
5.	Proper orientation										0	
6.	Proper timing (graph editor)										10	
7.	Bank roll/tilt										3	
8.	Tail support										0	
9.	Path complexity										7	
10.	Recorded animation										5	
<div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>Rotation has to be a straight line without ease</p>  </div> <div style="width: 30%;"> <p>Path is not smooth</p>  </div> <div style="width: 30%;"> <p>Airplane into ground</p>  </div> </div>												
<small>The flight is not quite realistic, too slow. Path is not smooth enough, check how you can smooth a path in Maya. The propeller rotation is in the wrong way. Has to be a negative value. Start position is tilting to the right side, one wheel in the ground. No variation in timing. You moved the airplane on the path instead of the path. No key frames used for tilting.</small>											Total	49.5

Figure 5. Prototype 3 is a solution for an animation assignment. The small images were not a great success.

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

4 Results

4.1 Results from the Learner 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 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.

4.2 Results from the learner 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.

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FEEDBACK AND MARKING SCHEME ASSIGNMENT 2 PGG
Threejs 2016 - 2017
 Marker Alain Simons

Xxxxx Yyyyy
75/100

Conclusion
 This is a very nice setup. Fully working in the majority of modern browsers.
 No errors showing up in the Console, very good.
 Two points of attention, use external style sheets for the css as you did for the JavaScript.
 There is a drop in frame rate when switching light conditions. Guess it's hard to improve.

CODE - 25/40%	PROGRAM - 50/60%	Own Contribution to the project
Using the code standards some acceptable good excellent 10%	Lighting and shading 10% Point Light Spot Light Directional light Use of textures Materials Shaders Shadows	The application of Image Loader The application of Object Loader Reference contribution others
Code Quality Program basic good very good excellent 10%	Controls 10% Camera controls Mouse / Keyboard controls	Bug level 10% wide some few very few
Design and structure demonstration basic good very good excellent 10%	Advanced features Level 10%	Interaction Level 10%
Readability, comments basic acceptable readable easy to read 10%		

- You used the MTL Loader in a correct way

```
var benchMtlLoader = new THREE.MTLLoader();
benchMtlLoader.load('models/obj/3/
benchMtlLoader.load('bench.mtl',
function (material) {
  materials.push(material);
});
```

- Good application of lighting and shadows.

```
<title>Scene Lighting: Times of Day</title>
<style>
  body {
    margin: 0;
    overflow: hidden;
    background-color: #f00000;
  }
</style>
```

**Use external style sheets
 Lot easier to handle.**

Good structure in your programming

**During the play most of the time 60 FPS
 drops down to 27 FPS
 when changing light
 conditions**

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

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

Table 1. From the feedback provider perspective.

	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

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

Table 2. From the learner perspective.

	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

to visualize the graphs (difficult to read, too small) on the animation feedback taught us that the visualization of 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. As part of this aim, it is important that the examiner builds up a feedback sheet in a similar way to the final output that a student will receive. This WYSIWYG (What you see is what you get) design flow will help ensure that the feedback response will be more personal and relevant than anything that could potentially be generated from data or even WYSWYM (What you see is what you mean).

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. Supporting a variety of media is important for the proposed system to work. For example, examiners may well want to embed audio clips and videos onto the feedback "sheets" where the students can then click to enable them as needed. A storage and recovery facility that allows for this will need to be slightly more flexible than simply storing i.e., PDF files.

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.

5 Conclusion

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 where 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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