



Grass Roots Project Report

Digital Feedback Inquiry – “From Waste to Table”
Version 1.0



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Introduction

Background

The idea for the project was to take a waste or co-product stream from a current food production facility and convert this waste stream into a food product that students could incorporate into other edible products. This could be a raw material (such as a flour) to be used as a substitution for a grain-based ingredient or could be a novel food ingredient. The plan was to facilitate the project through the integration of digital technologies in order to bring together the students with experts from various areas, so students could interact with the ideas of others at all times, not just when they are in the classroom. The idea was that the proposed technologies would enable the students to interact with the experts and share knowledge or experiences with all the group, so every student had the opportunity to benefit from these interactions.

The project was focused on a Level Three Food Technology class at a decile 9 school. It involved myself as the lead researcher, and was overseen by one of our Deputy Principals at the school. The project involved 2 Achievement Standards (10 credits in total) and was conducted over a period of approximately 18 weeks.

Over the previous two years I had taught Level 2 and Level 3 Food Technology respectively, so had the privilege of working with the same students over a two year time period. During this time I had changed my teaching practice so that I now utilised industry experts as our stakeholders when available and had also integrated the use of Google Docs into the programme of work for formative feedback. Both classes over this time period had been rather small (5-10 students) and I noticed one student in particular had thrived completing Level 3, and had improved her grades significantly over the time period, from low Achieved grades in Level 2 to high Merit and even Excellence grades at Level 3. When I completed student voice questionnaires at the end of the year, I noticed that the students commented positively on this teaching practice, so I wanted to see whether this had actually improved student achievement.

Objectives/inquiry questions

The main objective of my inquiry was to determine whether utilising a combination of industry experts and digital technology in the classroom helped engage students and thus increase their success in AS 91609 and AS 91611 for TEF 301.

Background reading/literature review

Over the past two years our school's professional development focus had been on digital technologies and their use within the classroom. During this time I had attended numerous professional development sessions within the school, looking at different digital technologies and how they could be utilised to improve student achievement in the classroom. As a result I had tried a number of digital technologies, such as Google Classroom, Google Docs, creating videos on YouTube, Flubaroo and Screencastify.

For those technologies that I had not had the opportunity to trial, such as Google +, I found staff members who had used them and asked for feedback, and then I accessed them and had a go at utilising them. I felt that if I could teach myself how to use it then it should be relatively easy to incorporate this into the student learning.

Assumptions/theories/definitions

As stated above, I had noticed how well a student of mine had improved in this subject over a two year time period but didn't know what had caused this. Was it merely that she had been taught by the same teacher at both Levels 2 and 3 and as a result the step ups between year levels had been clearer? Had her understanding of the subject improved? Had her work habits matured? Or, had the use of industry stakeholders and/or digital feedback technologies had a positive impact on her achievement? Perhaps it was a combination of all of these? Therefore, I didn't have any preconceived theories about how this inquiry was going to conclude.

However, I did feel that the more frequently I could provide feedback to the students throughout the learning process, the more engaged they might become or at least they may be more inclined to act on the feedback if it was completed on an ongoing basis. If they could see that I was frequently critiquing their work not just at planned intervals but whenever they requested it, that perhaps this would motivate students to keep up with their portfolio work and not just the practical work.

From personal experience, I remembered how amazed I was when given the opportunity to visit manufacturing companies when conducting university study as it provided a completely different viewpoint of what we were learning in the classroom. It showed me how my learning was being put into practice and I felt that if I could provide similar experiences to the students that perhaps they may also be more engaged in their learning.

Glossary:

Primary stakeholder - the primary stakeholder is the client (business) who has a need to be addressed. As such they have a major interest in the success of the project because the business is directly affected by the outcome.

Direct stakeholder – the person or group of people who are involved in the day-to-day activities of the project. In this case, these are the people who taste-test the product being developed and provide feedback so the student can improve the product.

Methodology & Design

Methodology

When planning the project I tried to ascertain the best way to measure whether utilising a combination of industry experts and digital technology in the classroom helps engage students and thus increases their success in AS 91609 and AS for TEF 301. In conversations with colleagues and with my Deputy Principal, we decided that the best way to collect data for this type of trial was to look at qualitative measures, such as using student voice, so that we could consider the opinions of the students, as they were the ones who could determine whether the proposed methods helped to engage them in the programme of work or not.

Alongside this, as a summative assessment, we decided to look at the quantitative measure of assessing final grades from 2017 and comparing these to the grades for the same curriculum area and level in 2016.

Project design

With Technology Achievement Standards, NZQA has suggested that a number of Achievement Standards be incorporated into one portfolio-based project, otherwise the written requirement for the course is far too great for the number of credits available to the students. Therefore, with this in mind, the project was set up to incorporate AS 91609 and AS 91611 into one project. The scope required students to plan and prototype a food product from a current waste ingredient. Two field trips were planned for this project: one to the factory where the waste was being sourced so students could witness vegetable production on a large scale and the other to The New Zealand Food Innovation Network Food South plant, so students could see first-hand how products could be scaled-up from laboratory to pilot scale.

As part of the project, a Google Drive folder was set up for the class, where teaching and learning information was shared. Another sub-folder for each individual student was set up and these were shared with the researcher. These acted as a depository for all student work and provided the researcher with the ability to scope level of work completion and provide ongoing feedback on work completed prior to submission for assessment.

The students were aware that the researcher had been given a grant to look at whether digital technologies and industry mentors helped improve student engagement and their opinions were also gathered informally throughout the project, so that they also had ownership of the project.

Methods aligned with inquiry questions

Inquiry question	Method used to address question
<p>Does utilising a combination of industry experts and digital technology in the classroom help engage students and thus increase their success in AS 91609 and AS 91611 for TEF 301.</p>	<p>Qualitative interviews via Google Forms were used to gather baseline information about the class and what types of sharing technology they would prefer to use throughout this project. These were also used to gather information about the use of digital technologies and industry experts in increasing their engagement in the project.</p> <p>Quantitative assessment data was gathered at the end of the project and compared to 2016 data for the same Achievement Standards.</p>

Data generation/collection

Baseline summative Achievement Standard data from the 2016 TEF 301 class was generated using KAMAR (FileMaker Pro Advantage 15.0.3.305). This programme analyses student achievement data, breaking it down by Achievement Standard, then measures it against National Statistics from the previous year, all Decile 9 schools from the previous year and gender. This data was generated using grades submitted to NZQA in 2016 and were generated by the researcher and discussed with the Deputy Principal.

Inquiry data was generated using Google Forms and the questionnaires were developed by the researcher with guidance from our Deputy Principal and Head of Department. The link for these questionnaires were then emailed out and results collected digitally from the students. As Google Forms collects responses automatically from the students via their login details, responses are genuine and cannot be modified by the researcher, therefore the need for an independent person to collate the data did not exist.

Final assessment data was collected by the researcher and then moderated by a colleague who has extensive experience marking Technology papers for NZQA. These grades were entered into KAMAR and submitted to NZQA, then compared to results from the 2016 TEF 301 cohort.

Data analysis

For qualitative data collected using Google Forms, the researcher looked at trends by applying a percentage weighting to answers to see which was the predominant theme.

As discussed above, summative Achievement Standard data from the 2016 TEF 301 class was generated using KAMAR (FileMaker Pro Advantage 15.0.3.305). For 2017 grades, these were also entered into KAMAR. This programme analyses student achievement data, breaking it down by Achievement Standard, then measures it against National Statistics from the previous year, all Decile 9 schools from the previous year and gender. This data was generated using grades submitted to NZQA in 2016 and were generated by the researcher and discussed with the Deputy Principal.

Findings

1. Initial Questionnaire

A questionnaire utilising Google Forms was completed by 9 students prior to commencing the project. The questionnaire asked the students to state what usual communication tools they used, platforms they utilised for sharing school work, if they followed any blogs, what blogging tools they might have used in the past, whether they enjoyed these or found them successful, what communication platform they would prefer to use when communicating with their independent experts, how often they might check this, what would make it successful for them and reasons why they might not like to use this form of communication.

The results showed that eight out of the nine students had already used Google Docs for gaining feedback, were familiar with it and comfortable to use it in this context.

Eight out of the nine students did not follow blogs, predominantly as they had never seen the need to do so and were not interested in this form of communication at all.

The preferred method of communicating with our experts was via Facebook, with 100% of the students already using it. Therefore, in discussion with our industry expert, a “secret” Facebook group was set up and members asked to join the group. The secrecy was due to the confidentiality of the project for the industry partner.

2. Summative Questionnaire

Within a few weeks of starting the project, three participants left school, which meant that only six students remained in this class.

A summative questionnaire utilising Google Forms was completed by four of the six remaining students (66.6%). This questionnaire asked the students how they found the various digital technologies and the input from the industry experts and whether they had been helpful in engaging them in the project.

All respondents said that they found the Google Drive useful for sharing information, but to varying degrees.

With regards to the use of the shared folder for gaining feedback, 75% of the students found it very useful for gaining feedback and receiving teacher guidance. All students felt that enough feedback had been provided throughout the course and that it was constructive and readily available.

The students found the use of Google Classroom slightly unnecessary due to the shared Google Drive, however they felt it was a good tool to use when the class was being taken by a relief teacher.

As stated above, the Facebook group was not successful. The students found it unnecessary and one student commented that they “were hesitant as it crossed the line between our school life and our personal lives”.

When asked about whether the use of industry experts had a positive effect on their involvement in the project, 100% of students said that it did. Responses were as follows:

- It makes it feel more official.
- It showed us that what we were learning was applicable in the outside world.

- Yes, I felt they got me more interested in the project and I better understood what I was supposed to be doing.
- It was interesting to see industry and our expert did share some insight into our waste product which was useful for research.

3. Summative Achievement Standard data

The following table shows summative Achievement Standard data for AS 91609 and AS 91611 for Level 3 Food Technology classes from 2016 and 2017. As can be seen from the data, there was little difference between year groups for AS 91609, with three of the five students passing this AS. With regards to AS 91611, one less student achieved this AS in 2017 compared to 2016.

	Number of students			
	Not Achieved	Achieved	Merit	Excellence
AS 91609				
2016	2		2	1
2017	2	1		2
AS 91611				
2016	2		1	2
2017	3			2

Discussion

Unfortunately the student results for these two Achievement Standards show that there was very little difference between 2016 and 2017 results. Only five students ended up completing the work (same number as in 2016) as one student asked to be withdrawn as he had enough credits to pass Level 3 NCEA and was leaving New Zealand before the end of term to represent New Zealand in an international sporting event so was not going to have time to complete the required amendments. One student with very low attendance (<60%) did not submit his portfolio for final assessment, so was an automatic Not Achieved for both Achievement Standards, despite having completed a large amount of the work and gaining formative feedback on it throughout the duration of the project. One student chose not to complete the amendments required to pass the 2 Achievement Standards in the given timeframe, so was also a Not Achieved. In the first two terms this student attended a University course every Monday and admits that this affected her progress with this subject. Another student chose to complete some of the amendments so she could pass one of the Achievement Standards (AS 91609), but not complete the amendments required in order to achieve AS 91611. These non-submissions and incomplete portfolios have obviously affected the statistics for this trial.

Three of the four students who responded to the final questionnaire found the digital feedback useful. The fourth student had stated at the start of the project that she preferred to have written feedback, so where possible I provided it in written form. However, this did create more work for me and I needed to ensure I had photocopied her critiqued work so that there was a record of it in case she misplaced her copy. From the researcher's perspective, digital feedback was far superior as it kept a record of the feedback given, the area to be addressed could be highlighted so the student could see exactly where the work needed to be edited and when the student had amended the work, the researcher was notified via email so she knew to critique to amendments.

Two students completed the work very well, both gaining Excellence grades for both Achievement Standards and one completing Scholarship Technology. These students actively utilised the personal shared Google Drive function, and sought feedback throughout the year, sometimes asking for critique of their work on a daily basis. When asked how they found the use of the personal shared folder for gaining feedback, one student wrote "It was super helpful getting feedback as you could easily see what part the teacher was commenting on in the documents and underneath you could ask any questions if uncertain. I would often leave comments while I was working if I was uncertain about anything which prevented me from forgetting questions I had if I was working on it out of class." This student had not used the shared personal drive with any teacher in any curriculum area prior to this year but had subsequently initiated the use of this in other classes to help her manage her workload.

All students found that the use of industry experts helped to engage them in the project. One thing that was noticeable during the site visit was that the students who were possibly the less able students in the class, and who had no prior experience of Food Technology at senior level were the ones who asked a number of intelligent, pertinent questions and seemed to be very engaged in the process. Unfortunately these students left school partway through the project, so it was not possible to gain their opinions on the usefulness of these visits in engaging them in the project.

The Facebook group was never successful. By the time the project was launched, the class was down to six students and the lead industry partner was pregnant, which meant that she was now no longer able to act as the primary stakeholder for the project. This meant the

students needed to find an additional direct stakeholder who could taste test their products and provide feedback. The students often chose friends or family members to fill this role, which negated the need for the students to correspond with the primary stakeholder as she no longer had the role of providing product feedback. She had also done such a fabulous job in briefing the students at the start of the project when they visited the factory, and this had been recorded and shared with the students via the Google Drive folder, so they had little if any need to contact her again for further information.

Google Classroom was also deemed slightly unnecessary by the students as they stated that the shared Google Drive was better as a depository for relevant teaching and learning information. The only use they felt Classroom had was when the class had a relief teacher and “it was useful as the information of what we had to complete was clear and easy to find”.

Limitations

There were a number of limitations throughout this project. Probably the most significant one was the very small sample size. The class started with 11 students but this quickly dropped to six as students changed subjects or left school to complete other study. This makes the findings of the inquiry very limited as the number is just too small to gain any valuable conclusive data, but can be used as an indication of trends. It is not possible for the findings from one small-scale inquiry to be applicable generally.

One student in particular was not keen on electronic feedback and made it clear at the start of the project that she would prefer handwritten feedback, so I would print her work and write comments for her. This wouldn't have been a significant issue if the sample size was larger, but in a class of six students it meant that the sample size for the trial was effectively five students.

Another limitation on this project was that the primary stakeholder/independent expert for the project became pregnant, which meant that she was unable/unwilling to taste test the products. This meant that the students needed to adapt their project to incorporate a direct stakeholder. In some ways this negated the need to communicate directly with the independent expert, as they no longer needed her feedback. This in turn meant that the Facebook group was effectively redundant as the students now had individual direct stakeholders, rather than a common primary stakeholder. For class communication, as the class was so small they could easily communicate in class time with each other or via email if/when required.

Implications/recommendations

As stated above, it is very difficult to make any definitive recommendations from this one small-scale inquiry as the number of participants was so small and the majority of the results were based on qualitative approaches.

However, that said, I do think that the trend shows that the use of industry experts did have a positive effect on the student's engagement in the project, as they all found it useful to relate their learning to the "outside world" and helped them to gain a better understanding of what they were supposed to achieve.

With regards to using digital technologies in the form of a shared Google Drive for storing teaching and learning material, the students found this useful as it was a good way to compile the information in one place and it organised their work effectively. Most of the students found that the personal shared folder was very useful for gaining teacher feedback, especially as the teacher had access to all their files relating to their project and could critique them at any time.

I think it is essential that the students are not overloaded with digital technologies, as the students felt that utilising a couple of technologies well was better than using many inefficiently. This was evident in their responses regarding the use of Facebook and Google Classroom, and that it sometimes caused confusion as they were not certain where to look for the information.

Conclusion/additional comments

When applying for Grass Roots funding in December 2016, I was unsure about the size of the Level 3 Food Technology class as those details had not been finalised. As is always the case, some Year 13 students do leave school at various stages throughout the year and this did have a significant negative impact on the study, as I was left with only 6 students completing the course of study. It would have been good at this point if the study could have been revisited as in hindsight, this type of project may have been better suited to a Level 1 or 2 cohort where class sizes are larger. As I was completing a similar project with my Year 11 Food Technology class, which had 24 participants, it might have been a better option to change the focus to this group of students rather than the Level 3 class. The Level 1 class also had industry experts and I utilised the same digital technologies, but I did not specifically measure the same factors in their student voice questionnaires, so could not report on those in this forum.