

Research paper

## Ecological Plunging and Wireless Filming for Science Education: A New Zealand Pilot Experiment

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### ABSTRACT

Seventy years of age 10 (13-15), students of the Queen's High School in NZ, were taken to Westland National Park to record films about the weather alteration employing iPads to assess if ecological plunging and wireless multimedia (use smartphones or tablets) could lead favorable feelings to technology (Immersion Community). Another fourteen participants (Control Community) stayed in Dunedin and recorded climatic clips as well. The tools, tutoring, rewards and footage were applicable to all classes. But the Immersion Group's students were more possibly to create high-quality clips and recordings. Although the perceptions of both participants to science until the analysis did not vary, the Immersion Community had far more optimistic views about technology at school and well beyond. The mixture of ecological plunging and wireless filming greatly raised the attention to environmental and climate alteration, indicating that it is a useful medium for science learning.



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### Introduction

Despite a growing reliance on science, social system continues to be an area which many, particularly the youngsters, consider it intimidating and impermeable. Globally, the scientific involvement of high school pupils has declined significantly and worryingly (Potvin and Hasni 2014, Tröbst, Kleickmann et al. 2016). Throughout New Zealand in particular, high school students tend to take science courses in lesser amounts over the last three years where science is an alternative (Gluckman 2011). It is important that more young people are interested in research to change this pattern (Strekalova, Krieger et al. 2018). Ecological plunging is described as an ability to involve pupils and inform them on sciences (Davis 2010). Analysis also shows that interest with science improves if pupils: (i) take

part in the manufacturing of a movie or podcast, instead of just reading or listening about scientific subjects (Rifkin, Longnecker et al. 2010, Rifkin, Longnecker et al. 2010, Martin, Davis et al. 2019, Finkler, Medvecky et al. 2020), (ii) release the goods in the general realm, thereby increasing the commitment, since learners can consider the value of what they are conducting (Saul 2012), (iii) tend to inquire questions about actual experts (Clark and Das 2014), (iv) are "attached" to scientific knowledge that is originally concealed by concentrating on an appealing or "sexy" subject (Trautmann 2013), (v) working with knowledge communicated by narration instead of facts-based training (Davis, 2010), and (vi) tend to carry out tasks that require a particular thing that many adolescents bring with them nearly any

moment: their wireless systems (i.e. smartphones and tablets) (BRESSLER 2006).

Furthermore, though there is data to suggest that film-based environmental programs will improve interest, awareness, and perceptions regarding research (Leeds, Lukas et al. 2017), to present, no study has been done on the importance of integrating ecological plunging and filming. We developed a pilots' experiment leveraging drama students from Queen's High School in Dunedin, New Zealand to evaluate initially some ecological consequences on the perceptions of high school pupils towards research, coupled with wireless filming. In order to witness the natural climate of the park and its two glaciers, The Fox and the Franz Joseph Glaciers – which withdrew owing to global warms, we brought a group of learner to the Westland National Park (Immersion Community) (Purdie, Anderson et al. 2014). The visional glaciers were the anchor used by participants of climate alteration sciences. There appeared a further community (Control Community), but video from the glaciers and Westland National Park were given. Students were asked in both communities to manufacture video clips regarding climate change (3 minutes' length) using iPads provided. With equitable connections to film mentoring, climate change specialist pose science questions as well as opportunities to fill out the videos for all participants. They advised students that they would also be shown at the biennial New Zealand International Science Festival and also made accessible digitally for visitors if their movies reached a certain acceptable criteria. In addition they were advised that the best film would be rewarded as an opportunity to inspire students to focus on this initiative, which had to be completed beyond the school syllabus. We suggested three theories centered on the above literature reviewed to evaluate:

H1. Students of the Plunging Community will respond favorably to their immersion in this sterile setting, their surroundings and the recording mission given to them,

H2. Students from the Plunging Community will establish a more optimistic outlook to science class relative to students from the Control Community, and

H3. The members of the Plunging Community will be more favorable than the students of the Control Community to pursue science following their academic term.

## **Methods**

We employed a class in Year 10 at Queen's High School that described itself as being really involved in this alternative issue (Mention: science is a mandatory topic for pupils in New Zealand before

the termination of the 10th year). This is an all-female decile 5 school located in Dunedin, New Zealand, which means that its pupils come from a floodplain in the center of the socio-economic spectrum in New Zealand (Endres 2009). A total of 31 participants from 14 to 15 years of age were employed. The participants were entirely optional and the participants may at any point avoid taking part if they so desired. A mobile video workshop took place at the University of Otago's Center for Science Communication on 14 March 2016, attended by all 31 students. The six-hour session dealt with the use the iPads for filming, iMovie for correction and interaction narration strategies. In order to discourage any prejudice on our behalf, a third person (the principal), who was neither an instructor for the learners nor a session member, subsequently segregated the girls into two classes.

The Plunging Community (n=17) was brought by bus to Westland National Park, 555 kilometers from Dunedin, for three consecutive days of plunging in the park between 2 to 4 April. The park is renowned for the glaciers of Franz Joseph and Fox that have withdrawn as a result of increasing environmental temperatures. The students were tasked by using the photographs which they took over the three days with their iPads (iPad Air II), to create a three-minute clip regarding weather alteration. (Note: we choose iPads supported instead of enabling students to use handheld devices – smartphones and tablets – for all the students throughout this project to optimize the learning and recording skills) They had to build a narrative that addressed a part of global change emerging from anthropogenic changes in greenhouse gas dispersions. 16 days they need to finish their clips. The Control Community (n=14) remained in Dunedin and was also instructed to make a 3-minute clip about climate change through iPads over 16 days. In addition, 20 minutes fresh movie from one of us (LSD) were sent to the Fox and Franz Joseph Glaciers and Westland National Park and openly integrated in their clips. Both groups (given by WF) had additional editing guidance and, on March 23, Professor James Higham, an authority on climate change talked to both groups at the university. The students might query him to enable them to learn and build their narratives regarding climate alteration. The students had to study the climate change problem and compose their own clip drafts as scene of the film production activity.

On 15 March, all participants had a brief survey of their views and curiosity in science until filmmaking started (pre-experiment). On 14 April following the students had submitted their movies, we replicated this experiment (PostSurvey). We hypothesized that Plunging Community will establish

more optimistic perceptions than Control Community in order to: (i) studying scientific topics at school and (ii) the prospect of seeking a profession in science. To verify that, we tested the participants' answers to the following two proclamations:

- Science and technology are appropriate topics for learners to discover at college, and
- I hope to research science once I graduate from college.

On 5 April, at the end of the filming in Westland National Park, participants in the Plunging Community were provided an additional evaluation to know their reactions to the area and the plunging encounter itself. Just at end of the analysis, we have conducted semi-structured conversations with ten Plunging Community participants and four from the Control Community. Such conversations focussed on four main topics: engagement in the experiment, perceptions regarding science in general, expectations towards science in their subsequent investigations, and the importance of filming as a classroom setting. As rewards to engage, students were instructed there would be an award for the best movie and that all finished clips that had good standard would be released as section of the International Science Festival, New Zealand's science carnival that is organized in Dunedin every two years, and also rendered accessible to the general via an internet platform ([www.sciencevideo.org](http://www.sciencevideo.org)). We measured the video performance separately (WF and LSD have both been producing movies and educating filming since over two decades) and our grades combined for each student's video. The criteria for exhibiting at the workshop those clips: a clear plot, enduring audio, and no sound or artwork that was not the learner creation unless it was a licensed usage of a Creative Commons. Assessment of the clips as component of the 2016 International Science Festival occurred on Sunday 10 July 2016 before an attendance of 350 students.

### **Findings**

To sponsor our assumption H1, involvement with the filming operation was far stronger for the Plunging Community that traveled to Westland National Park compared to the Control Community. Besides that, performance of the clips as a representation of the level of responsibility of the participants, was far greater generally for students in the Plunging Community: 12 (71%) of the clips created by students going to Westland National Park reached the lowest requirements expected to be shown as part of the International Science Festival, while only 4 (50 %) of the movies made by students in Dunedin accomplished this. Two pupils, both from

the Plunging Community, were collectively given the prize for original screenplay. At the beginning of the test program, the Pre-Survey showed there were no major variations between the Plunging Community and Control Community in their approaches to learning science at college and then after. There was an equivalent reaction to the influence on their participation in filming. Including 14 (93%) out from the 15 students who replied, the exposure had strengthened their curiosity in science traditionally. Moreover, all of the participants in the Plunging Community stated that the learning had helped them to consider more profoundly concerning climate alteration and the world, along with 11 (65 %) reacting 'much anyway'.

The high drop-out frequency of the students in the control group vs zero in the immersion group shows that they were less interested in this work, considering the fact that, to the realistic degree, the two classes provided the same support, benefits and goals (i.e., make a 3-minute film about climate change within 16 days). The only big distinction was that in the Westland National Park the plunging community rendered the movie as a component of the workout. For both populations of learners, the happiness with the cinema per se had been strong. Student A's evaluation of what 'It's been so nice' represents the optimistic outlook of all four girls who agreed to engage in semi structured conservation. Throughout the conversations provided by the ten plunging Community participants even a constructive approach to filming was expressed, with Student B stating, "I have often loved movies and the news, so it was like a huge subject to me and it supported me a lot." The discrepancies that were seen in assessments were primarily due to the influence of being in the natural surroundings of the Immersion Community students, which gave further evidence for the H1 assumption. Student C states this is a perfect place to experience, 'I enjoy heading up to the glaciers and seeing them directly.' Furthermore, it changes the way she approaches the research, making it 'a more realistic version of knowledge and how it influences the modern settings and not just how items are composed.' Another student from the immersion community, Student D, characterized his uncontaminated atmosphere as the best portion of the journey, 'observing whole of the environment, such as the cascades. It was amazing." Student E, who compared the national park impression with that of living in Dunedin, mirrored this by something else: 'Dunedin, there are very literally houses, and there is just nature and it's all done.' In brief, the agreement resulting from half-structured discussions with students of the Immersion Community was that their perceptions to the ecosystem and climate

alteration and subsequently to research were improved with the perspective of living in the Westland Nation Park.

Table 1. Post Research discrepancies between the Control and the Plunging Community as to their perceptions towards the analysis of science during and following education. The Likert 5-point answer measure was graded from -2 (heavily dissatisfied) to 2 (heavily agreed) with the argument, with 0 suggesting neither cooperation nor disapproval. Students may even opt not to offer a grade (don't understand). The impact of ecological plunging shall be evaluated employing the Student's t-test with a significance extent established at  $P < 0.05$ .

Statement		Control Group	Immersion Group	P value
Science and technology are important subjects for people to study at school	Mean	0.64	1.3	P= 0.05*
	Variance	0.56	0.84	
	n	8	17	
I intend to study science when I finish school	Mean	-0.79	0.24	P= 0.03*
	Variance	1.37	0.85	
	n	6	13	

Table 2. Percentage (%) of participants from the Plunging Community addressing for each choice questions regarding how much the perception of being submerged in Westland National Park ('the camp') has affected their perspectives on the world, research, weather alteration, and filming.

Question	Very much	Quite a lot	A little	Very little	Not at all	n
How much has this camp make you interested in the environment?	57.5	28.7	11.8	0	0	17
How much has this camp make you interested in science?	19.9	59.6	12.9	0	4.5	15
Did the camp help you think more deeply about climate change and the environment?	63.8	29.5	5.8	0	0	17
How much has this camp make you interested in film making?	59.01	29.3	5.8	5.8	0	17

### Discussion

All students from the Immersion and Control Community had equal capabilities to the components proven to maximize their participation. In other terms, they created their original video around an international research conference and they developed a subject of science (Alsop and Watts 2003), released in the public realm (Saul 2012). The famous glacier of New Zealand was used by students as "trigger" to research climate change sciences by exploring challenges to the glaciers posed by global warming (Trautmann 2013). The sciences of their movies have been communicated through saying stories (Davis 2010) and the videos have been rendered by smartphones that are particularly appealing for students (Park 2011). In addition, when making their videos, students had connections to a true investigator (Finn, Yan et al. 2018). Additionally, the findings of our research have confirmed our conclusions that the science perceptions are strengthened by integrating environmental plunging with the use of smartphone filming to build narratives about a science element. Both classes varied only in ecological immersion, and those students who went to the national park were more involved in the practice, worked stronger, and consequently had dramatically changed perceptions

towards the study of science at college and so after: a strong and impressive reaction to the treatment. In conceptual words, people are considered to be influenced by a natural world (Seamon 2015). The findings of this research – that the participants react favorably to the impact of being submerged in a pristine setting – are compatible with the results of environmental classrooms and outside skills training (Finn, Yan et al. 2018). The idea of Eco Pedagogy in particular has evolved to advance the desire of the United Nations for sustainable educational institutions (Whiting, Konstantakos et al. 2018). The findings of our study were also aligned with Hadzigeorgiou's (2016) training concept that recommends that a mixture of narrative and environmental miracles can lead to an enhanced commitment to knowledge. This happens since the artistic importance of the natural environment by the students poses a concern regarding empirical theories originating from natural types and occurrences (Hadzigeorgiou and Skoumios 2013, Hadzigeorgiou 2016). The presence of our immersive community students in the virgin woods and glaciers of the Westland National Park induced their curiosity, which in conjunction with imagination, allowed them more optimistic approaches to research, in order to create a movie concerning natural events.

Observational results from Hadzigeorgiou (2016) is that students in schools with comparable age to those in this sample were committed to science topics while teachers intentionally encouraged admiration. One point is that, as happened with the usage of mobile video, transition from traditional teacher-based education to successful student-based training could have benefited all classes, regardless of their extent of environmental plunging, as regards scientific perceptions (Hasanah 2020). Although both Immersion and Control participants had been understood to like filming as a means of contact and education, from a pedagogical viewpoint, it was surprising that they did not develop their perspectives about science.

In other terms, the fact that the participants took a more optimistic approach towards research was the ecological plunging not the filming per se. One aspect affecting this outcome is that these activities were required outside the school and the school syllabus. In comparison, mobile movie production will become a more successful means to encourage students' perceptions towards science when introduced into the classroom through an education system (Martin, Davis et al. 2019).

### **Conclusion**

This study indicates that the ecosystem plunging in locations including National Parks will build a nimbus impact that contributes to more favorable perceptions to research, when coupled with creating environmental interaction by means of wireless filming. Although we must bear in mind that this research is just an unique preliminary study utilizing a very limited sample size, it is still promising for student activities in science education in schools and beyond to be influenced by this kind of ecological contact for training filming. The application of a control group to evaluate approaches throughout educational study is not particularly popular and this may have consistency in our findings. The findings of the pilot research definitely encourage students in their approaches about knowledge and indicate that broader and more complex experiments are needed.

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