Capturing Undergraduate Experience through Participant-Generated Video

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The enrolment and attrition rate in science degrees in the Western world is of increasing concern, both nationally and at university level. At the same time, teaching undergraduate science requires universities to invest in laboratories, staff and equipment to meet the initial demand of enrolling students. In this article, I discuss participant-generated video as an innovative method of research used in a study to extend understanding about the experience of science students' experience in an Australian university. In this paper, I present the methods and practices used to explore the experience of a selected number of undergraduate science students, using a phenomenological approach. Students used video cameras to record their daily experiences and their commentaries on these over the course of a semester. This method of data collection presented interesting issues related to ethics, the underlying organization of the design, and the way the students engaged as participant-researchers. The results of the study showed that the method of participant-generated video data collection educated the students on aspects of research ethics involving human subjects and on reflecting on meaning, which enabled the students to present powerful insights into their own experience. Keywords: Higher Education, Science Undergraduates, Student Experience, Video Data Collection

The numbers of students in higher education have increased dramatically in the past twenty years, but enrolments in science and related courses have not followed suit (Dobson, 2007; Rice, Thomas, & O'Toole, 2009). It has become of increasing importance to science faculties in higher education to (a) attract students and (b) encourage student retention. In Australia various initiatives, including government grants, have been used to improve science learning and teaching at undergraduate level, with limited success (Rice et al., 2009). In one Australian university, the science faculty leaders chose to focus on an intense investigation of student experience with the goal of facilitating the improvement of services to science students. I was commissioned by this science faculty to conduct a research study to capture the student experience. In negotiations with an appointed science faculty leader (termed here "the project sponsor") we negotiated a method of data collection which relied on the students to collect the data using video recorders. In this paper I give an account of how the method worked, the challenges that arose and how these challenges were resolved.

This paper starts with an introductory section on using video in research, ethical issues in the research, the recruitment and selection of participants, preparatory workshop for the selected participants, and collection of the data. This article also sets out the challenges in analyzing the data and the strengths of the method. I argue that this method of participant-generated video data collection gives rich insight into student experience in a way that sets it apart from other methods such as interviews or observation.

Using Video in Research

Improvements in technology have caused corresponding changes to field methods in research (Negrón, 2012). One of these changes has been to video cameras, which are smaller, easier to handle, and record digital footage. In this article, I present a research study where video cameras were used to capture the experience of university science undergraduates. Using video in social research forms part of the genre of methods based on the assumption that contributions to knowledge can be made through researching visual manifestations of human behavior and material culture (Pauwels, 2011). Visual research methods have been used in a variety of disciplines and fields such as anthropology, education and sociology (Pauwels, 2011; Pink, 2009).

In this study, the students recorded their own participation in a process of participant-generated visual images. Participant-generated visual imagery [1] is a term used where participants produce the data, which is then analyzed and made sense of by the researcher. Delamont (2002, p. 9) argues that "each researcher is her own best data-collection instrument as long as she is self-conscious about her role, her interactions and her theoretical and empirical material as it accumulates." In this study, I delegated the responsibility of data collection to the participants themselves, enabling them to control what entered the research study as data and to represent their own interests as they saw fit.

There have been a number of studies that have involved children and vulnerable groups where participant-generated data has been captured through photography. A significant method of research using photography is "Photovoice" (Joanou, 2009; Karlsson, 2001), a term coined by Wang and her colleagues (e.g., Wang & Burris, 1997; Wang & Redwood-Jones, 2001) and created to "enable people to assess the strengths and concerns of their community and communicate their views to policy makers" (Wang & Redwood-Jones, 2001, p. 560). Photovoice is a transformative research method, enabling vulnerable groups to participate in research that can make a positive impact on their lives (Aldridge 2007, 2012). In contrast, phenomenological research enables the investigation of the essence of lived experience in terms of the way that phenomena present themselves to human beings (Dukes, 1984; Giorgi, 2009; Vagle, 2009). The method I created for this study, which I have called "VideoVoices," draws from an ideographic approach to phenomenology (Smith, Flowers, & Larkin, 2009), which investigates how specific individuals make sense of a specific phenomenon, in this case, how undergraduate science students make meaning from their experience of being an undergraduate science student. Where PhotoVoice shows the "voice" in the singular, denoting the community level of the research, the plural in the label "VideoVoices" indicates the ideographic nature of the method, where the individual is the focus of the study. Thus "VideoVoices" pays homage to its predecessor, PhotoVoice, a transformative, photographic method, while highlighting the phenomenological, ideographic nature of using video.

In the study that forms the focus of this paper, students' data simultaneously showed the content of their experience (that is, what they experienced), and also the choices that they made in how the depiction was captured (Pauwels, 2011). In interviews, participants choose the words and examples that describe the experience and meaning (Eatough & Smith, 2006). In this study, the use of video enabled the students to make choices about how the camera was used, the scenes recorded, and the people towards whom the lens was turned, resulting in the collection of profoundly rich data that added depth to the overall conclusions.

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[1] Pauwels refers to "respondent-generated visual imagery," however, I have changed this term to reflect the active nature of the participants' involvement.

Ethical Issues in the Research

Conducting qualitative research involving students on behalf of an educational institution tends to be fraught with ethical dilemmas. In most cases, university students will be eighteen years of age or more, and thus generally considered old enough to make their own decisions concerning involvement. The disparity in power between students and university staff, however, means that protocols have to be put in place so that students do not feel coerced to participate, to falsify or warp data to appease university staff or the researchers, and cannot be identified. In addition, qualitative researchers have to negotiate the Scylla and Charybdis of complying with ethics review boards of their universities and other organizations, and then deal with the situated ethical issues caused by the participants' situations and circumstances (Swauger, 2011).

This study was "mindfully" planned with considerable emphasis on the situation of students, the likely scenarios that would occur and the ethical issues that may arise (González-López, 2011). Mindful practice does not rely on procedural or automatic thinking; each situation is creatively scrutinized and responded to (Langer, 1997). The understanding of the need to carefully consider and reflect on ethical issues is a recurring feature in qualitative research, although the term "mindful practice" may not be used (see, for example, Joanou, 2009; Pink, 2009; Wang & Redwood-Jones 2001). Undergraduate science students are often young adults without much life experience, who are faced with surviving university while finding the resources to live. Although these participants were capable of informed consent, I needed to consider that decisions made now could have an impact on their future lives. In planning the study, I was fortunate in the intense collaboration between the project sponsor and me, which continued until the submission of the final report. During the design and conduct of the study, we agreed that:

- No student involved in video data gathering would be identified to the faculty, commensurate with normal ethics requirements.
- The final report would be disseminated only to the higher echelons of the faculty, so that no lecturer could guess (rightly or wrongly) the identity of the students.
- Science lecturers would be notified in advance of the study and of the possibility that students may approach them for interviews, and/or to film short segments of their lectures or tutorials.
- The decision to include science staff in video recordings would be left to the students, who would be warned of the implications in the preparatory workshop.

In effect, there was a barrier between the science faculty and the participants and research staff of the research study, which could be breached only by the participants themselves. The other two major ethical issues that were identified were in relation to paying the students for their time and ensuring that the recording was ethically conducted.

Paying the students.

Science students, due to the requirements of laboratory work, tend to have a high number of required contact hours, and may often have to also undertake part-time work to help them meet the costs of a university education. The faculty sponsor and I agreed that, in these circumstances, it was fair for the students to be compensated for their time. The funding provided enabled an hourly payment to the students based on the amount of footage recorded.

Grant and Sugarman (2004) noted that, in most cases, incentives provided for research are not harmful, except in cases where there is undue influence to participate in the research or the research diminishes the dignity of the participant (p. 719). Grant and Sugarman point out circumstances in which incentives can be ethically questionable as situations where:

> … the subject is in a dependency relationship with the researcher, where the risks are particularly high, where the research is degrading, where the participant will only consent if the incentive is relatively large because the participant's aversion to the study is strong, and where the aversion is a principled one—when these conditions are present, the use of incentives is highly questionable. (p. 732)

In this sense, the payments offered to the participants could be considered incentives if they were in excess of fair compensation, that is, more than the opportunity cost of students forgoing paid employment to do the research. In fact, discussions with the university human resources department indicated that the payments made were a fair compensation for the students in terms of their age and qualifications. The National Statement on Ethical Conduct in Human Research (National Health and Medical Research Council, 2007), which guides research in Australia, allows payment to research participants provided that the following principle is followed: "…payment that is disproportionate to the time involved, or any other inducement that is likely to encourage participants to take risks, is ethically unacceptable" (p. 20). In this case, using the human resources department of the university provided an impartial assessment of the appropriateness of the payment proposed.

Grayson and Myles (2005) note that the requirements of ethics review boards can create problems for researchers. The ethics review board which reviewed this study routinely enables the classification of research as "low risk" or "high risk" based on a set of criteria. One of these criteria stated that payments of more than AUD$75 to research participants caused research studies to be classified as high risk. This criterion caused serious problems in timing for the study as high risk research was a matter for referral to a full ethics review panel, requiring a considerable delay in obtaining clearance. It was important that the first stage of the research occurred early in the semester so that the first year students could record footage about their first weeks at the university. I made a case that the criterion of $75 was not required by the National Statement of Ethical Conduct or other ethical codes in other countries. The involved ethics review board, however, required scrutiny of the payment made to the students to ensure that the payment was not disproportionate and finally approved such payments as fair compensation for the efforts required from the students. How the delay affected the data collected, however, is unknowable. Certainly student video capture of the initial reactions to university life among first year students was deferred.

Some of the students admitted to some qualms at the beginning of the data collection process about their competence to undertake the data collection in an effective manner, but none of them indicated financial motives for undertaking the research.

An administrative issue concerning payment arose during the study. Some of the students were surprisingly slow in claiming payment. The human resources department then changed the method of claiming payment from paper to electronic forms without providing very much notice. Despite repeated instructions and requests, some of the students did not understand how to claim payment, and some one-to-one instruction was needed. This added unnecessary strain to the management of the study.

Including payment as part of the research study meant that the students' right to withdraw from the study, or selected footage from the study, had to be amended. Generally, the right to withdraw from a study is undisputed, but where payments are made to participants

throughout the study, it was easy to imagine a situation where a student could lodge the video footage, receive payment and then request that specific video be withdrawn from the study. Redeeming the payment from students in these circumstances would be extremely difficult. I formulated a strategy to prevent such a situation, which formed part of the submission to the institutional ethics review board. The students were advised that, although they could exit the study or choose not to submit footage for downloading, they could not extract previously submitted footage for which they had been paid. This condition was included in explanatory material, and carefully explained to the students so that they were clearly aware of the consequences of participating in the research.

Ensuring ethical data collection.

A significant concern in this study, involving participant-generated data collection, was ensuring that the students would record only footage that was collected in ethical ways. For the purposes of ethical clearance, and for the purpose of explaining ethical practice, the people who could possibly be captured on film were classified into three groups. The first group was the students who were specifically recruited to record the data and who were briefed on ethical issues in the research in a preparatory workshop. The second and third groups were identified as follows:

- "Involved bystanders" - these participants were chosen by the student-researchers for interviews and observations in terms of how the involved bystanders illustrated elements of student experience. People in this group were asked by the student-researchers if they were willing to be recorded, and had to sign documentation to signal that agreement. An explanatory statement and consent form were provided to this group by students. The necessity for this was discussed with student-researchers as part of their introduction at the preparatory workshop, as well as through coaching on the ethics of research with human subjects.

- "Uninvolved bystanders" - members of this group were those who were captured by the student-researchers on digital media, but who were incidental to the study. Their selection was random, as their inclusion in a recording did not directly form part of the data analysis. For example, if a student-researcher chose to record the campus centre, and a person walked in front of the camera, that person's image is part of the data collection, but would not be part of the data analysis. These people were not recruited nor invited to be part of the research study and their consent was not required.

Pink (2009) urges that research involving the senses, such as this visually-intense study, be collaborative and participatory. This ethos informed this study, which was collaborative and participatory due to the choices the students could make concerning their levels and nature of their involvement. On the other hand, it was necessary to impose constraints to protect the student-researchers, the community in which the research took place and to ensure the study yielded useful insights for the faculty sponsor.

Recruiting the Students

The study was publicized through student bulletin boards. Interested students were directed to a website with further information about the study, and an application form that

they could complete and email to me. I selected the students on the basis of how the application form met criteria that has been agreed to by the sponsoring faculty. These criteria ensured diversity of disciplines, a reasonable gender balance, and ensuring that they were from the main campus of the university. The participants also had to attend the preparatory workshop. Five first year and five third year undergraduate students were chosen. Among the first year students, there were three women and two men and among the third year students, there were three men and two women.

The initial contact with the students brought to light a communication issue that perhaps reflected generational difference between me and the students. Before the workshop, I emailed particulars to the selected students and encountered no response. It then occurred to me to send text messages by mobile telephone; responses from all the students were forthcoming within hours.

The Preparatory Workshop

Attendance at the preparatory workshop was non-negotiable. If an applicant could not attend, they were not permitted to take part in the research as a student-researcher. I developed the workshop by using the research questions, the ethical implications of those questions and the VideoVoices method as key foci. Clearly, in order to use the video cameras, the student-researchers would have to be coached in their operation. The use of the video camera meant that possible data collection scenarios were wide-ranging. The student-researchers could talk to the camera themselves, they could interview others, they could record places that had meaning to them, which had the potential to include others (see previous section). In addition, my previous research related to science teaching had given me some knowledge of what was important in an undergraduate science degree, and reflections on feelings and meanings generally has little coverage in a science degree.

Thus, the workshop was designed to enable the students to learn about human ethics, and the ethical requirements of this study in particular, the operation of the video cameras, which were JVC HD Memory Cameras. The workshop also included exercises on recognizing feelings, and drawing meanings from those feelings, that were drawn and adapted from the work of Allen and Mary Ivey (1999). The students undertook individual and group exercises to help them feel comfortable with explicating their experience. They were instructed on the operation of the cameras, and undertook exercises to become proficient. All the students were provided with my mobile telephone number, and were strongly encouraged to call me if any serious issues arose. A major goal of the workshop was for the students to identify with their new identity as "student-researcher."

The focus of the research was to empower the student-researchers in terms of determining what they would record. The only constraints were that the footage had to:

* involve their experience as science students at that university,
* be ethically collected, and
* be meaningful.

I made it clear to students that I did not want to sit through, and would not pay for, hours and hours of science lectures, with one person standing out the front talking. Much of the workshop was spent exploring boundaries for the student-researchers, both ethically and in terms of recording footage that would meet the goals of the study. The student-researchers were anxious about doing it "right", while I was eager to enable some independence in choices, believing that the choices themselves would yield valuable data. Thus, their brief was to shoot footage that had meaning, and that they should provide a commentary if they

were afraid that I would not understand what the footage was about. I was prepared to endure some baffling footage, but in fact, these somewhat vague directions yielded useful, rich and in-depth data.

Collecting the Data

Student-researchers were required to record footage during three periods in one semester. At a pre-determined time, I emailed the students and asked them to collect their camera, which they retained for ten days to two weeks. I then emailed them at the end of the period and asked them to return the camera, and footage would be downloaded. After the third data collection period, student-researchers were asked to participate in a final interview. Seven of the ten students-researchers participated in the interview.

Although the student-researchers were versed in ethical consequences of data collection decisions, their freedom to collect the data in ways they found most comfortable meant student-researchers had to determine their own means of representation through their data collection strategies. I watched the videos repeatedly, viewing the files chronologically student by student as well as all the video from one stage. I came to realise that the strategies used by the student-researchers caused the student-researchers to relate to the camera in different ways, essentially assigning different roles to the camera. By a process of inductively analysing the patterns of interaction between the student-researchers (and sometimes the friends of the student-researchers) and the camera, I inductively built a classification of the roles. These roles were:

* *camera-as-diary.* The student-researchers would place the video where their face could be recorded, and talk directly to the camera, musing on their activities, thoughts, emotions and reflections. Some of the student-researchers, in introducing their lives, showed footage of their bedrooms, and places in their homes that they felt were relevant to their student activities. The tone of these displays was similar to showing a new visitor around the house, where they would explain the normal function of the room, and how they used the room. Although the diary footage showed the student-researcher in one place, talking to the camera, often the interruptions would illustrate aspects of the student-researchers lives. For example, Anita, a new first-time mother, would suddenly become alert during recording, and with a murmur about the baby, turn off the camera. The next clip would show Anita returning and explaining that the baby had woken up/started crying and so on. Other student-researchers would be interrupted by (usually) their mothers with inquiries about laundry and other household issues, illustrating continuing family support for that particular student-researcher.

* *camera-as-tourist.* The student would walk the camera around the campus, explaining how things worked or common activities. Clark, for example, showed us around the Campus Centre:

> This is the Campus Centre. There's lots of things here like doctors. Pretty much everything you need. You can see why it's so accessible to live on campus at [University] because you've got doctors and pharmacist, fast food places, some grocers, you know pretty much everything you need. There's a counselling thing. I make use of that, you know, I'm struggling a bit, not feeling too well. I'll talk more about it later. I always get sushi for lunch. It's fucking awesome, excuse the French. The sushi place is really good. I get sushi every Friday. I don't like take away much, but sushi's good.

* *camera as avatar/friend.* Here the camera was placed on a communal table and was witness to the banter and conversations of the student-researcher and their peer group. The peer group and the student-researcher at times talked to me, at times talked to or about the camera. In some cases, the camera came in for a share of teasing as if it held a type of consciousness. Benjamin, in response to teasing with friends, explained to the camera:

> They are gossiping about us. I am talking about the camera and me. We now have a thing. We are a match made in heaven, aren't we, camera? It's a very one way relationship. I am happy with that.

* *camera as witness.* Occasionally, student-researchers would organize footage of a situation that, in their opinion, needed change. In these cases, the student-researchers would record the event or situation while relating the history and particulars of the situation.

> The tables in there suck though. People drop their things. First thing I saw when someone dropped things off their table because they lent on it and it shifted the table down, their lap top broke. So, I don't know, maybe just for future reference, build better tables and lecture theatres, especially when you've got a high volume of people in them. Every time we're in South 1, something bad happens. Someone always drops their things. (Clark)

MacDougall (1997, p. 276) noted that "… [a] body…, removed from its usual surroundings, was often singularly uncommunicative about culture." It is argued that interviewing a research participant removed from their normal surroundings denies the researcher access to the rich cues concerning culture and structures that place and material culture provide (O'Toole & Were, 2008). Using this method of participant-generated video enabled students to be continually immersed in the places and cultures they inhabited. They not only recorded their expressed thoughts, feelings and sense-making, but provided footage of their homes, lecture halls and gathering places.

Analyzing the Data

The purpose of the research was to provide information to the science faculty which had commissioned the study. The exploration of experience justified a phenomenological approach to the study. Phenomenological research seeks to explore the essence of lived experience, in terms of the way that phenomena appears to human beings (Vagle, 2009). Objects outside of consciousness are known as "givens,"; phenomenology seeks to understand the inherent structural properties of the sense and/or meanings that human subjects make of these givens (Dukes, 1984; Giorgi, 2009). The analysis of the data was where I made sense of the meanings made by the student-researchers.

The analysis of the video recording commenced when the stage one footage was delivered by the student-researchers. It quickly became clear that when setting the parameters of how much recording the students could do, I had vastly under-estimated the amount of time needed to transcribe, view and analyze the video. When planning the research study, I had assumed that the student-researchers would record footage of sustained periods, perhaps 20 – 30 minutes in duration. Most of the student-researchers, however, would turn on the video whenever they saw something they believed would be of interest, or when a thought occurred to them. Hence the number of video clips was far more numerous that I had anticipated. Where the video contained recorded talk that was significant, such as a student-researcher talking to the camera, or talking with friends, this talk was transcribed, and NVivo software

was used to analyse the transcript. This, however, was a relatively small part of the analysis. I found analyzing the running video much easier when simply viewing the video on a computer in full-screen mode, and making handwritten notes with the video time recorded. These lengthy notes were added to or amended with each viewing of a student-researchers video record. From these notes, themes were developed that identified patterns of meaning. This mode of analysis was adapted from Interpetative Phenomenological Analysis, developed by Smith, Flowers and Larkin (2009).

Negrón (2012, p. 15) describes analyzing audio-recorded data as a "herculean task", and the work involved is even more when video images are involved. Student-researchers were told that they could collect up to five hours of video per stage, and their feedback showed that, in most cases, this amount of recording was simply too onerous to complete. In fact, the total amount of video collected amounted to 32 hours 5 minutes 54 seconds in 383 video clips. This amount necessitated a considerable amount of time and effort involved in analyzing the data.

Viewing the data for analysis was a compelling experience. The use of video gave a highly personal and yet dissonant perspective to the data. Simmel argued that sensory impressions become a vehicle for knowing the Other (1997 [1910], p. 111). The eyes, in particular, hold a special place in individuals interacting and connecting in a subjective way. According to Simmel, the "whole interaction between human beings, their empathy and antipathy, their intimacy and their coolness, would be changed incalculably if the look from one eye to another eye did not exist …" (Simmel, 1997 [1910], p. 112). In the case of this research, however, the sets of eyes are divorced from each other in both time and space. I could often see the eyes of the student-researchers, but they could not see mine. Our eyes were linked through the temporal and spatial portal of the camera lens, but the communication was one-way. Two-way communication occurred, in some cases, between the camera itself and the student-researchers. It became noticeable that some of the students began to forget that the camera was a vehicle for my research and not an entity in its own right. Gracie, for example, when commencing recording after picking up the camera from me for Stage 2 noted that:

> I actually missed the little camera [laughs]. Every time I had something happen
> at uni, I was, like, "Oh I can tell it to the camera"

In a later recording, Gracie, explaining her frustration at her own self-doubt asked:

> You know what I mean?

Realizing what she said, she noted:

> You're a camera. You don't know what I mean. [laughs]

For me, analyzing both the video recordings and the text transcriptions meant that the text transcription became a check for accuracy of syntax. The power of the video made the text transcription both inadequate and inaccurate. Rodaway (1994) points out that "the term 'sense' has an important duality or ambiguity" (p. 5). This duality or ambiguity refers to sense as meaning, as in *making sense* and sense as the sense modes of sight, smell, touch, and so on. Being immersed with the video, with my senses of sight and hearing engaged in the scenes recorded by the student-researchers, I found that *making sense* of the video and audio also meant that emotional judgments and varying feelings of empathy forced their way from the analytical considerations of the video scenes before me into my own practice as an academic.

For example, stories emerged that unconsciously contrasted lecturers who were arrogant, uncaring with those who inspired and practiced empathy. These prompted considerations of my own academic practice as well as offered material for the study.

The volume of video clips meant a time lag between recording, and download and viewing, which caused some difficult situations. In one case, my research assistant and I became concerned about a student-researcher who seemed to be pursuing a destructive course. The problem was that the videos we were viewing were a month old, and we were sensitive to maintaining the delicate balance between interfering in the student-researchers' lives and the need to ensure their safety. In this case, the troubling videos were collected during Stage 3 recordings and I could call the student-researcher in for an interview, which I considered could also be a way to see if she needed counseling or other services. As it happened, the student-researcher had taken control of her life, which will be further explained in the next section.

In addition to the aggregated findings that were required by the science faculty, their report also contained profiles that were ideographic in nature. These profiles were created using phenomenological methods, particularly bracketing as far as possible the judgments made by me, a middle-aged female researcher (Trotman, 2006), and situating the student-researcher in their own world (Rodaway, 1994).

Each student-researcher was invited to comment on their profiles, and in the one case where specific feedback was forthcoming, this was incorporated in the profile. Despite one of the advantages cited for the use of video is the capturing of sensory experience, the "phenomenal fidelity" meaning more warrant for the research (Wagner, 2011, p. 64), the video was for analysis purposes rather than for communicating results. Not only would using the video in reporting require far more onerous administration required by the relevant ethical review board, but I believe it likely that as time goes on, the student-researchers, as they get older, may view with dismay the prospect of videos of emotional commentaries possibly being available on the internet or through other media.

It is important to note that no claims for statistical generalizations were or will be made in terms of the findings of this research. Instead, the ideographic nature of the research enables the reader to gain insights into the experience of particular students in particular circumstances. The dissemination of the research results must have the richness to enable "transferability" (Lincoln & Guba, 1985) where the reader can judge whether similar conclusions are warranted in their local situation. A strong advantage of the ideographic nature of the research is that the depth of investigation enables the exposure of issues that may not be explored in statistical studies, simply because the researchers could not have read the prompt to enable them to follow up with related questions. Other strengths of the methods are discussed in the next section.

Strengths of the Method

The issues and challenges of using the method for the first time have been related above. The strengths of the method lie in the rich data that is generated, giving the student-researchers a voice concerning their needs, and, as a consequence, deep insights for the university faculty that are rarely attained. It also provides student-researchers with valuable new knowledge, resources, and experience in the social sciences.

The freedom of the student-researchers to choose the content, how to record footage within the delimited boundaries of ethics and relevance was facilitated by the preparatory workshop. The workshop was the foundation and the basis for the student-researchers' practice, and the decision to make the workshop a mandatory part of the study was justified by the ethical mindfulness that students adopted as they undertook the data collection.

Using video cameras generated rich data, as the student-researchers were very generous in sharing their emotions and aspects of their lives over one semester. The student-researchers recorded student places, student interactions, student study, and student learning. Their commentaries, with the emotions discernible in the voice tones, their body language and the words themselves gave a sense of immediacy and clarity to the content of the video. The in-depth findings of the research have enabled the sponsoring faculty to institute significant changes in their undergraduate program. Changes to the transition process from school to university for school leavers have been instituted, and directions for further research involving students have been refined and planned.

On an individual level, the research also benefited the students. For some, the money was undeniably useful, as the need to survive financially was identified in a number of video clips. Two students have asked me to be a referee for jobs, and for one student, in particular, the experience of completing the research study helped her turn her life around, as shown in the following quotation:

> … I also spent a lot of time thinking about what I'd do for the recordings, so that they'd be worthwhile, and for the first time, it made me think about situations that I wouldn't otherwise put a lot of thought in to, and it also made me realise, it was kind of good having something to vent to… and it's actually what made me be able to go and sign up to see a psychologist this semester,… But I have realised through doing this that I needed someone to talk to, because other things came up in the break that I'm not able to deal with alone, and I realise that even just on my studies, this did help me be able just to vent. I went to my first psychologist appointment last week. (Dymphna)

I wrote this paper due to the considerable interest in the method of participant-generated video data collection shown by colleagues at conferences. Possible future research directions could be to involve more students in other faculties, or more science undergraduates in other universities to build increasingly sophisticated pictures of students' experience in different circumstances. The method, however, could easily transfer to other situations such as investigations into occupations and workplaces, or particular groups who receive some type of service provision. Improvements in mobile phone video functionality means that video becomes increasingly a more accessible and affordable method of data collection, and cloud-based storage and sharing remove the need for physical downloading of the files by the researcher.

Conclusion

The purpose of this article has been to explore a method of participant-generated data collection that has been created to protect the interests of the participants, provide rich and compelling data for the research, and achieve the goals of the research sponsor.

I have shown how careful, mindful planning has dealt with the delegation of data collection to others but it is also clear that the internal administrative workings of universities can cause obstacles during the study which must be resolved. The age and experience of the student-researchers was also a factor that I did not appreciate would cause issues in terms of the student-researchers' lack of understanding of university payroll systems, and, to a much lesser extent, with me coming to grips with their usual modes of communication.

Perhaps, however, the greatest advantage of this method has been the insight granted into the lives of students, the depth of which is usually only possible to attain in longitudinal studies. I argue that the highs and lows, challenges and achievements, irritations and trauma

of being a science undergraduate could not have been communicated in the same way by interview or observation. This method of participant-generated video data collection portrayed the lives and represented the voices of science students. The control lay firmly in the hands of the student-researchers over a prolonged period to depict the images, settings and situations that give meaning to their experience, enriched by both time and movement.

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