

Virtual Field Trips: The Pros and Cons of an Educational Innovation

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Introduction

The burgeoning of the Internet and multimedia technology has opened up a world of possibilities for the classroom. Through the Internet, individuals can access information at a scale, speed and degree of personalization that leaves traditional texts and educational sources looking archaic in comparison. It was a small step to the development and availability of virtual or electronic field trips (VFT or EFT, to be used interchangeably) on the Internet and CD-Roms. Learners can now see images and manipulate information about distant places in ways that can facilitate engagement, collaboration and the development of profound knowledge schemas. Conversely, they can be baby sat in front of a screen and click passively through a virtual tour, depending on the site that is accessed.

The purpose of this article is to critically evaluate the concept of VFTs available on the Internet. As Norris (1990) points out, the primary goal of educational evaluations is to ascertain and provide useful information for judging decision alternatives.

In addition, this article will attempt to follow Ohler's (1999) directive to:

SEE (understand, make explicit hidden links)	+	EVALUATE (positive and negative impacts)	=	CONTROL (purposeful use and direction).
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What are VFTs?

VFTs appear to have evolved naturally out of the rapid growth of the Internet, particularly in the 1990s. As the world wide web (WWW) grew exponentially, more web sites were developed which included images and information about people, places and time periods. It was therefore a small step for educators and individuals to recognise the potential for digital field trips.

The terms VFT or EFT are used to describe a broad and eclectic range of multimedia experiences. Qui and Hubble (2002) noted that VFT was broadly used to describe any computer activities “that a user browses, step by step, link by link, click by click through a set of linked web-pages to acquire information” (Qui & Hubble, 2002, p. 76). Although there is no generally accepted definition of VFTs, Nix’s (1999) definition has been used by a number of researchers. Nix firmly linked the electronic experience to professional usage. Nix suggested that any “inter-related collection of images, supporting text and /or other media, delivered electronically via the world wide web, in a format that can be professionally used to relate the essence of a visit to a time or place’ could be identified as a VFT” (1999, p.1).

A natural result of the explosion of sites that can claim VFT status is the wide range in quality and genres of VFTs (Hovell, 2005). The early and less sophisticated versions of VFTs involved simulcasts of museum activities. Even today there are many VFT sites that are little more than linear virtual tours and whose sole purpose is to entertain or promote a destination (Bellan & Scheurman, 2001; Mitchell & Wesolik, 2002; Qui & Hubble, 2002). However, the current VFT model is more likely to be hyperlinked and more organic in form. These electronic experiences offer pre-broadcast teacher curriculum-based materials for teachers and students, synchronous question answering, power point displays, live broadcasts and archival copies of prior broadcasts (for an example see LEARNZ website, <http://www.learnz.org.nz>). As Cassady and Mullen (2006) noted, today’s high quality VFTs are multimedia products with text, audio, graphics, still images and moving pictures.

In addition, Hovell (2005) and Turturice (2000) identified a range of genres that can be encapsulated under the VFT umbrella. These genres include fact finding missions which visit countries and individuals, as well as culture-awareness activities, for example museum visits. Other genres include concept application and primary source exposure. For example, the field of geology has recognised the potential of primary source exposure and there is considerable research evaluating possible VFT usage in this subject field (Hurst, 1998; Qui & Hubble, 2002; Spicer & Stratford, 2001; Woerner, 1999). Other fields of science have also dabbled in the world of digital field trips. It therefore has been a small step to wonder at its application for junior social studies and for the natural landscapes topic in the senior secondary school geography course. With this end goal in mind, for this article I have chosen to focus on fact-finding missions and primary source exposure VFT. These genres appear to be the most applicable to the previously mentioned subject areas.

Like all technology, VFTs are not automatically educationally worthwhile (Woerner, 2000), nor are VFTs a one-stop-teaching-shop (Hovell, 2005). A number of researchers have recommended certain characteristics to facilitate high quality VFT learning experiences in geography and related areas. For instance, The Virtual Geography Department (<http://www.utexas.edu/dept/grg/virtdept/contents.html>) guidelines recommend that VFTs include geographical context, suitable duration and non-linearity (Ritter, 1997). Barta-Smith and Hathaway (2000) noted that VFTs needed to use maps to give the user a sense of space and location otherwise “the viewer is more likely to see a virtual landscape as a collection of fragmentary visual images” (p. 262). This evaluation will use Hovell’s (2003) guidelines for high quality VFTs, refer to the table below (adapted from Hovell, 2003, p. 72). In addition, any VFT examples cited will include at least four of the characteristics listed in Table 1.

Table 1: High quality VFTs include a combination of the following characteristics
(Adapted from Hovell, 2003, p.72)

a.	They are goal-directed with curriculum links
b.	They are based on authentic contexts
c.	They encourage the sharing of responsibility
d.	They provide multiple modes of expressions and various modes of learning
e.	They use interactive multimedia technology
f.	They make significant use of both synchronous and asynchronous communication.
g.	They recreate a semblance of reality
h.	They provide additional support for teachers and students, e.g., lesson plans and implementation guidelines
i.	They should reflect the elements of good web design
j.	They should be based on sound pedagogy and educational theory

In some respects, a VFT has a number of advantages over the PWFT from a teacher's perspective. Two obvious instances are that there are no transport times or delays to be catered for, and bad weather is unlikely to delay a VFT. In addition, the VFT can provide access to a greater range of experiences (Mitchell & Wesolik, 2002), as well as to hazardous or fragile environments (Qui & Hubble, 2002) such as Antarctica or the Amazon rainforest. In addition, the learning experience can be heightened by the simultaneous integration of field, laboratory and library data at a variety of scales and perspectives (Qui & Hubble, 2002).

On the other hand, a VFT can never recreate the sensory stimulation, insights or fluid social interactions of a PWFT (Bellan & Scheurman, 2001; Nix, 1999; Stainfield, Fisher, Ford & Solem, 2000). Although a VFT can provide a multi-modal presentation, it can not provide the 3-D awe-inspiring grandeur of snow-covered Mt Erebus, the cloying humidity of a rainforest, the acrid smell of penguin colony or the raucous cries of Howler monkeys. Even with a facilitating teacher, a VFT must be by definition an experience once-removed. Furthermore, the research in the field of geology found that

the VFTs did not allow for the participants to interact in a flexible manner or promote the same level of problem solving skills that can occur on a real physical environment (Qui & Hubble, 2002). It is therefore not surprising that research has documented teacher reluctance at using VFTs to by-pass the real world experience (Bellan & Scheurman, 2001).

Teachers' Perspective

Pedagogically, teachers are concerned with providing a learning environment that works: one in which the students are engaged and involved and helps them develop the schema they need to problem solve and transfer their knowledge to other situations. Furthermore, teachers cannot ignore that other educational imperative at senior secondary school level, that is, the students succeed in external assessments as well.

Hovell (2005) found that the use of the LEARNZ VFT were most successful when the innovation was implemented as part of a collaborative and constructivist learning environment. When teachers acted in a facilitating role and were co-learners in the process both the student and teacher stakeholders became enthusiastic and passionate about the learning medium. The teacher-student dyad can become more interactive and mutually supportive if the teacher allows the leap into the unknown and relinquishes traditional top-down control. In many cases the students will be 'digital natives' and will be comfortable in familiar digital territory and will discover ways of interacting with the medium that the teacher (digital visitor) may not have considered.

Cassady and Mullen's (2006) research identified ways in which high quality VFTs facilitated the development of natural learning impulses (Bruce & Levin 1997, 2001), that is, inquiry, communication, construction and expression. Specifically, Cassady and Mullen found that VFT student websites are designed as **inquiry** environments which provided choice, links to various artefacts, concept and content modules and open-ended questions. In addition, they noted the media can facilitate **communication** through document preparation, such as e-mailing, video-conferencing and teaching media. While the natural learning impulse of **construction** was catered for through the

numerous content-related activities that provide learners with chances to engage with the material and create their own interpretation of the content. Finally, high-quality VFTs facilitate **expression** by providing open-ended questions and multiple formats to spur the formation and expression of personal views. These views can be expressed on line, in e-mails, discussion boards and audio-conferences, or within their own classroom setting.

For any educational innovation to succeed, the teacher needs to perceive that there is considerable benefit for the teacher to implement it into the learning environment (Tearle, 2004). A primary concern from the teacher's perspective is whether the pedagogical benefits outweigh the inevitable technological obstacles. As discussed earlier, VFTs can facilitate a shift in teaching from traditional to a more beneficial constructivist approach. However, technical hiccups will always occur in any innovation implementation. Access to computers and other technology will always need to be negotiated. Time, effort and energy will be required from the teacher to implement the new teaching medium. Expert direction will need to be readily available and approachable. Live audio-broadcasts may be scheduled a time or stage of the year that the subject is not taught and require juggling of curriculum commitments. The teacher will also need to be comfortable that they may be learning alongside the students and that not all learning opportunities will be calm, linear or predictable. The LEARNZ site (<http://www.learnz.org.nz>) and Hovell (2005) both recommend new VFT users introduce the technology incrementally to ensure that the change is sustainable.

Students' Perspective

When evaluating any educational innovation, the students' perspective is obviously important. Generally, the key articulated aim of an innovation is to enhance the learning environment for the students. In my own experience, the students want high quality learning experiences that are relevant to their everyday life. They want to have fun and they want to achieve some level of success. Further, they want to have some level of control of what, how and when they learn.

With this in mind, there is anecdotal and research evidence to suggest that students enjoy using digital field trips (Hovell, 2003; Spicer & Stratford, 2001; Stainfield et al., 2000). Learners appreciate the attention-grabbing and interactive nature of multimedia experience. In addition, students of all ages comment positively on activities that allow them to manipulate and personalise information (Nix, 1999; Spicer & Stratford, 2001; Stainfield et al., 2000). Interactivity allows the students to create their own knowledge, although Qui and Hubble (2002) suggest that time issues may arise if the students become too involved or focussed on a site, and so direction is required.

High quality VFTs can encourage engagement and involvement through interactive activities such as simple problem solving activities like choosing what crops to plant in successive years in the Amazon rainforest (<http://www.homeworkspot.com>) or asynchronous sites such as web boards to submit those 'extra questions' spurred by personal interest (<http://www.learnz.org.nz>). The motivating force of self-determination can also be achieved when the learners recognise that they are in control of the conversation with an expert in an audio conference.

Cassady and Mullan (2006) stress that live broadcasts are a valuable part of VFTs. Live broadcasts increase levels of excitement and immediacy as well as facilitating the feeling of being part of a larger learning community. Conversely, Cassady and Mullan (2006) note that archival EFTs left "the learners in an isolated learning condition" (p. 156). Whatever the model, the successful VFT, from a student viewpoint, is grounded in a strong information base and interaction with real people doing real things (Sommerville, 1999, p. 2).

However, student support for the use of VFTs is gleaned from enthusiasts promoting the use of VFTs or from research investigating teachers who use VFTs in a constructivist and integrated manner. The former plays down or ignores VFT problems and the latter is less likely to observe poor teaching methods. As Bellan and Scheurman (2001) document, VFTs can be misused in similar ways to real life field trips. The novelty value of an electronic experience will wane if the computers are used repeatedly as a digital baby sitter to pacify students. Moreover, older students will recognise if the

learning objectives are unclear or if there is little preparation or post trip follow up to enhance the learning experience. The learning experience will be discounted and disparaged. “The bottom line is that the success of VFTs like traditional field trips, are massively dependent on preparation for the experience, engagement while on the trip and carefully planned reflection after the field trip is over” (Cox & Su, 2004, p. 120).

Interestingly, in one detailed investigation, Spicer and Stratford (2001) sought zoology student reactions to the use of a specifically-produced *Tidepools* VFT in a Level 2 university paper. The research found that while the students were genuinely excited and engaged by the VFT, the students were unanimous in the view that digital field trip should not replace the PWFT. The students clearly stated that they wanted VFTs to be used alongside the actual field trip and not as an either/or situation.

Orion and Hofstein’s work (1994) also supports the idea that VFTs be used alongside real life experiences. They suggest that the high level of novelty experienced on a field trip can interfere with the learning process. They identified three types of novelty: geographic, psychological and cognitive. These researchers reasoned that if students are in an unfamiliar place, unfamiliar social setting and involved in unfamiliar academic work, it is less likely that they will have a meaningful learning experience. Rather the students will need time and exposure to all three novelty aspects of the trip before real learning can take place. Therefore from a student’s perspective, a high quality VFT can facilitate the development of prior knowledge schemas and allow for practise of observation skills thus ensuring that the maximum learning value is gained from the PWFT. Students can opt to make repeated visits to a VFT which also allows the individual to control his or her learning (Nix, 1999).

Spicer and Stratford’s (2001) investigation also found that the lecturers and students perceived the *Tidepools* VFT differently. Students commented that they found the VFT had too much text and was too content heavy. Conversely, the lecturers recorded the opposite observation. This suggests a difference in experience and learning paradigms. Perhaps today’s learners are more comfortable with a multimedia content and dislike text heavy resources that were the learning staple during their lecturer’s early academic

careers. Spicer and Stratford noted that the VFTs were modified in subsequent years, following its use and evaluation with students.

Designers' Perspective

The designer of an innovation can reinforce old ways of teaching or support new ways of learning, depending on the underlying pedagogy. A 'knowledge acquisition' pedagogy is reflected in a text-dominated and linear format with many "gratuitous button pushing" activities (Plowman, 1996, cited in Hovell, 2003, p. 138). The designer using this pedagogy makes the assumption that the students are passive vessels waiting to be filled and satisfied to be lead through the experience in a similar way to watching a television programme.

A VFT with a more "constructivist and technology-enhanced base" (Cassady & Mullen, 2006, p. 151) employs interaction and collaboration to facilitate knowledge acquisition and comprehension. This is reflected in multiple modes of expression and activities such as live broadcasts and utilising a facilitating teacher who 'lives' the experience. The designer of a VFT with a constructivist pedagogy makes the assumption that knowledge is socially constructed and active participation is a necessity. The designer may also assume that the learning experience itself will be intrinsically motivating and so few extrinsic rewards may be offered. This can be seen on the VFT examples found on the *homeworkspot* and *LEARNZ* sites (<http://www.learnz.org.nz>). Hovell (2005) and Cassady and Mullen (2006) moot that a constructivist pedagogy is more educationally valuable and in line with current education theory.

Teachers need to know that a VFT is pedagogically sound and technically possible and it is the designer's role to reassure them on these points. Pedagogically, the value of a VFT increases if the site makes explicit its learning purpose and direction. An example of a clear mission statement is found on the *LEARNZ* site:

Creating unique learning contexts and offering stimulating learning is only part of the story. Integrating them into 'teacher owned classroom programmes' is

another. LEARNZ has built over the years a programme that supports every teacher regardless of their confidence with technology. Our programmes see teachers gaining confidence and becoming inventive and creative in integrating technologies into their teaching programmes (<http://www.learnz.org.nz>).

As Hovell (2005) noted, high quality VFTs need to be goal directed and have clear links with the curriculum to ensure valuable learning takes place. There are a number of New Zealand organisations which have developed electronic learning sites with the New Zealander curriculum in mind (e.g., LEARNZ, <http://www.learnz.org.nz>; *Seat of Power*, http://www.tki.org.nz/socialscience/curriculum/SSOL/power/index_e.php). Sites originating from other countries may not be relevant or may require adaptation to make them useful for New Zealand classrooms. Overseas examples include the JASON series (<http://www.jason.org/>), *Licancabur, Bolivia-Chile Exploring the Highest Lake on Earth* (<http://www.extremeenvironment.com/expedition/index.htm>) and *Earthwatch Global Classrooms-Wild Dolphin Societies* (<http://www.ri.net/RIGeo/rigeo/earthwatch/earthwatch02/dolphinhome.html>).

An advantage of VFTs for the designer is the opportunity to share a real life experience with others in an exciting and fluid way. For instance, in the *Wild Dolphins Societies* VFT, a teacher is able to show through images and diary entries her personal involvement in a study on the marine mammals. Her enthusiasm is palpable. Designers can use VFTs to promote awareness and share their interests with the larger community.

An issue for designers is the sheer numbers of VFTs available on the Internet, which can inhibit their interaction with the other stakeholders. Valuable VFTs can be lost in the sheer volume of those available.

Decision Alternatives Considered

Hovell's (2003) study found that the primary teachers who used the LEARNZ VFTs observed that their teaching styles changed at the same time. The teachers in the study recognised that their classrooms became more collaborative and constructivist without

any additional professional development. They observed that they had not only learnt about the content, but they also learnt about the technology and got an opportunity to examine their own pedagogy. The teachers were therefore led along this path by the learning tool they were using. As Burbules and Callister (2000) note “we never simply use tools without them using us” (p. 6).

As Table 2 indicates, there are numerous advantages to incorporating a high-quality VFT into an educational programme. Moreover, many of these advantages are pedagogical in nature. VFTs have been shown to facilitate the development of a more collaborative and constructivist learning environment if the innovation has an underlying ‘constructivist and technology-enhanced base’ and the teacher is open to such an experience.

Further to this, many of the disadvantages summarised in Table Two are technical or involve inappropriate application of a VFT. Technical obstacles are not insurmountable particularly if the teacher is excited by the possibilities and willing to persevere. Enthusiasm and a belief that an enhanced learning environment eventuate, can ensure that the necessary time, effort and energy will be found. Realistic expectations of what can be achieved will need to be maintained, however, as recommended by Hovell (2003) and LEARNZ (<http://www.learnz.org.nz>).

Table 2: Summary of advantages and disadvantages of implementing high quality VFTs into a classroom programme

Teachers' Perspective	Students' Perspective	Designers' Perspective
<p>Advantages</p> <ul style="list-style-type: none"> • Can facilitate the development of a collaborative learning environment. • Stimulates four natural learning impulses: inquiry, construction, collaboration and expression. • Less organisation and time away from school than PWFT. 	<p>Advantages</p> <ul style="list-style-type: none"> • Students find VFTs enjoyable. • Students comfortable with multimedia format. • Hyperlinks and audio-broadcasts can lead to feeling of self-determination and increase motivation. • Can provide real life problem solving scenarios. • Students can repeatedly visit and review VFTs . 	<p>Advantages</p> <ul style="list-style-type: none"> • Opportunity to share a real life experience • Can facilitate the development of constructivist learning. • VFT model is evolving into a more sophisticated product.
<p>Disadvantages</p> <ul style="list-style-type: none"> • Need access to computers and prolonged technical assistance. • Cannot recreate the sensory 3-D experience of a PWFT. • Time, effort and energy needed to find appropriate sites and implement VFT in class. 	<p>Disadvantages</p> <ul style="list-style-type: none"> • VFT learning experience degraded unless it is integrated into the class programme. • Can be used as a baby sitter or passive activity. • May be used to replace <ul style="list-style-type: none"> • a PWFT. • Less beneficial than the real world experience. <ul style="list-style-type: none"> • It is easy for students to be sidetracked or procrastinate over sites (time management issues). 	<p>Disadvantages</p> <ul style="list-style-type: none"> • Communication between teachers, students and designers may be delayed. • Vast numbers of VFTs means it can be difficult to attract users.

Another contributing factor to the decision-making process is the direct curriculum links apparent within the VFTs highlighted in this evaluation. For instance, the social studies strands of:

- people's organisation in groups and their rights, roles, and responsibilities as they interact within groups;
- to learn about society and to enable them to participate responsibly in society.

may be enhanced by the *Seat of Power* VFT (http://www.tki.org.nz/socialscience/curriculum/SSOL/power/index_e.php) or there may be a place to show:

- people's interaction with places and the environment and the ways in which people represent and interpret place and environment

within the *Marshian chronicles* (<http://www.ncsu.edu/meridian/2000wint/estuary/estuary6.html>) and *Griffith Park* (<http://www.laep.org/target/technology/secondary/griffith/>) VFTs.

Senior geography is another area in which selected VFTs have direct application. For instance the *LEARNZ Tongariro* VFT (http://www.learnz.org.nz/trips/tongariro_volcanoes.php) would help the Year 12 students construct their own understanding of a complex natural landscape. Also the students could consider the real life options of a farmer in the Amazon as shown in the *Amazon rainforest field trip* (incorporated within <http://www.homework.spot.com>). The virtual experiences would not be replacing an existing field trip and could be used in conjunction with existing units.

Iding, Crosby and Speitel (2002) observed that one of the reasons why teachers do not implement ICT in their classes is because of the time needed to search for suitable quality online resources. There are written and digital sources that can help illuminate the way to valuable resources. Examples of these include Gail Cooper and Garry Cooper's (1999) text *More Virtual Field Trips*, the New Zealand TKI social studies

sites (http://ssol.tki.org.nz/social_studies_years_1_10; http://ssol.tki.org.nz/senior_social_studies_years_11_13) and well as the JASON series (<http://www.jason.org/>) mentioned earlier. The aim of these sources is to steer “readers away from those Internet sites that are either thinly disguised advertisements, are inappropriate for K-12 students, or are run by people or organisations that seem, to put it charitably, suspect” (Cooper & Cooper, 1999, pp. xv).

Conclusion

The digital era is upon us. Its presence is ubiquitous but as yet the non-neutral tool has not become institutionalised or an invisible part of the learning landscape (Sherry, 2002). The purpose of this evaluation was to investigate the issues and concerns surrounding the VFT innovation from the perspectives of the three stakeholders, that is the teachers, students and designers.

The use of high-quality VFTs have a number of pedagogical advantages from the teachers’ perspective. Electronic field trips can encourage and support the development of a discursive and collaborative environment in which the teacher and students take responsibility for the learning that takes place. Authentic and real life contexts can be explored in a variety of ways to suit all learners. VFTs can cultivate interaction with the site, classmates and the wider learning community. VFTs are a way to enable our students to be connected, life long learners.

Many students are already immersed in the digital world. Unlike some of their less technology-savvy teachers, they do not hesitate in the face of technical obstacles and the time, effort and energy required to utilise this new development. VFTs have been shown to enthuse and excite students. Learners comment positively on the multimedia format and the move away from text-heavy learning resources. Learning can come alive for the young people when they realise they are in charge of the media and available experts. From a student’s perspective, learning opportunities are downgraded if the VFT is used as a stand alone activity, if interaction with the real world is limited or if traditional top-down forms of classroom management structures are maintained.

VFTs came into being in the 1990's as part of the world wide web and have, so far, avoided the 'too-hasty, wide adoption by schools' indicative of a fad and a pendulum syndrome (Maddux & Cummings, 2004). This has allowed the VFT model to progress and evolve over time into an innovation that has clear links with theory and research. This evaluation has identified numerous advantages for the main educational stakeholders to utilise VFTs and found that the pitfalls of such usage can be avoided with careful planning and direction. The recommendation of this evaluation is to add high-quality VFTs into your teaching tool repertoire.

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