iExperience, iLearn, iConserve: A comparison of mobile-driven, physical and guided interpretation for sustainable transform...
WHTER & ICES 2015

‘New Paradigm Era and Roles of Tourism’

- Date: May 20 ~ 22, 2015
- Venue: Sejong Hotel, Seoul, Korea
- Hosted by: College of Hospitality and Tourism Management, Sejong University, Korea

iExperience, iLearn, iConserve:  
* A comparison of mobile-driven, physical and guided interpretation for sustainable transformative learning

**Eunice Tan**  
The Hong Kong Polytechnic University, Hong Kong

**Rob Law**  
The Hong Kong Polytechnic University, Hong Kong

**ABSTRACT**

The discourse on sustainable tourism commonly advocates the value of effective interpretation in ensuring positive environmental outcomes, learning opportunities and visitor satisfaction. While environmental interpretation has been extensively discussed across various dimensions of sustainable tourism, the evaluation of different interpretative techniques available vis-à-vis their effectiveness in achieving sustainable transformative learning has not been explored. Moreover, while studies have examined the dimensions for effective learning within the contexts of pedagogy, technology-enhanced learning and transformative/experiential learning, there is yet to be an investigation of mobile-driven interpretation for sustainable transformative learning. This study aims to present a comparison of mobile-driven, physical and guided interpretation for sustainable transformative learning. Specifically, it examines the effectiveness of the different interpretative tools in achieving sustainable tourism, conservation and visitor learning outcomes. The study explores research themes within the domains of (1) environmental interpretation and visitor experiences, and (2) experiential and transformative learning for sustainable tourism. Qualitative research data were collected from field trips to a nature-based attraction in Singapore by a group of (85) undergraduate students taking a sustainable tourism module.

**Keywords:** Transformative learning; Experiential learning; Mobile learning; Environmental interpretation; Sustainable tourism.

**INTRODUCTION**

The discourse on sustainable tourism has frequently advocated the need to manage and mitigate tourism experiences through effective interpretation to ensure positive environmental outcomes, learning opportunities and visitor satisfaction. Current studies on interpretation had commonly highlighted a number of conditions through which pro-environmental attitudes and conservation outcomes can be achieved through effective interpretation and transformative visitor experiences that challenge and alter a person’s environmental values, attitudes and behavior (Moscardo, 1998; Zeppelin, 2008). However, effective interpretation should not be merely about telling visitors to conserve, but should instead be about communicating appropriate messages and content, using suitable communications platforms that encourage sustainable behavior and conservation awareness (Newsome, Moore & Dowling, 2007). Often, the major obstacle hindering effective interpretation and learning is not due to visitor characteristics or the topic being presented; the problem is with the approaches through which messages are communicated. Tourism experiences offer a plethora of natural, cultural and community resources from which learning activities can take place, and provide a channel facilitating the visitor transformative learning process. Learning in-situ has much to offer in terms of visitors’ experiential and transformative learning (Taylor, 2007; Minnaert, 2012).
Concurrently, mobile-driven technologies and applications available today offer countless options catering to tourists’ communications, information and social-connectivity needs (Wang & Xiang, 2012). There has also been growing interest and developments within the education sector on the effective pedagogical and adaptation of learning content and courseware from traditional or other digital platforms to conditions suited for mobile devices (Ozdamli & Cavus, 2011; Wang & Shen, 2012). While environmental interpretation has been extensively discussed across various dimensions of sustainable tourism, the investigation of the various interpretative techniques (static/physical, guided and mobile-driven) available vis-à-vis their effectiveness in achieving sustainable transformative learning has not been explored. Moreover, while studies have examined the dimensions for effective learning within the contexts of pedagogy, technology-enhanced learning and transformative/ experiential learning, there is yet to be a comprehensive investigation of mobile-driven interpretation for sustainable transformative learning. This study investigates the effectiveness mobile-driven applications vis-à-vis other interpretative tools within the connotations of visitors’ interpretative experiences and transformative learning outcomes. Parsons and Ryu (2006) called for a more holistic strategy for assessing transformative learning effectiveness, emphasizing that the “quality of a learning experience is not solely based on the quality of the software (product quality) but also on the conceptual basis upon which the learning experience is constructed” (p. 17). With the above objectives in mind, the study’s core research domains are framed within the dimensions of (1) environmental interpretation and visitor experiences, and (2) experiential and transformative learning for sustainable tourism.

**LITERATURE REVIEWS**

**Designing and Interpreting the Visitor Experience**

Interpretation is the process through which information is provided to visitors about the attraction, with the objective of encouraging concern and appreciation of the place through knowledge acquisition and education (Moscardo, 1998). Interpretive programs can contribute positively to a destination’s visitor management strategies by encouraging visitors to engage in more environmentally sustainable behavior and influence visitors’ pro-conservation attitudes and sustainable behavior through an educational process (Reisinger & Steiner, 2006; Yamada & Knapp, 2010). Hughes (2013) posited that “enhancing visitors’ environmental knowledge and attitudes is likely to prompt the adoption of environmentally responsible behaviors” (p. 42). Interpretive programs may include, but are not limited to, physical displays/signage, interactive exhibits, guidebooks and brochures, audio-visual materials, guided tours, visitor centers, community outreach programs, and other mobile, online and offline/static information (Ballantyne, Packer, & Hughes, 2008; Hughes, 2013; Weaver, 2008). Fundamentally, interpretation is simply about translating technically- or scientifically-complex information into language and ideas that people who are non-experts can easily understand; and is communicated in a way that is enjoyable, entertaining, thematic, interesting and relevant to the targeted audience (Ham, 1992; Weaver, 2008). Newsome et al. (2007) further recommended the application of an education–knowledge– awareness trilogy in the interpretive process to facilitate firsthand experiential learning.

Concurrently, Zeppel (2008) had suggested an experience–learning–action model to facilitate positive conservation and learning outcomes, in which she advocated the need to heighten visitor knowledge acquisition and empathy during visitor experiences to enable environmental learning and future conservation intentions. Appropriate affective (emotional) and cognitive (intellectual) responses generated through interpretive experiences vis-à-vis the type of interaction with different interpretive tools mediates the tourism encounter to influence pro-environmental attitudes and inspire future socially responsible behavior. As highlighted by Yamada and Knapp (2010), there is a need to design visitor-driven interpretive programs that enable personalized experiences and
meaningful connections since “visitors pay attention when they are interested and allocate their limited time and attention to experiences that will satisfy their curiosity” (p. 208). Beyond the cognitive–affective–behavioral stimulation trilogy, it is also important to consider how messages are being communicated by those providing the interpretation. Ap and Wong (2001) had reviewed the functional capacity of guides as mediators between the visitors and the environment. As mediators, their central role in the interpretive process should not be just about telling visitors how to act, behave or think; it should instead be a facilitative process that guides visitors towards constructing their own conclusions and transformative learning journeys. Reisinger and Steiner (2006) had discussed the role of interpretation and guides, suggesting interconnectedness between people and the world around them, in which sense-making, projected identities and past experiences drive attitudes and behavior. This individual persona or self-identity would affect how visitors experience and understand interpretation. Thus, to be effective, interpretive programs have to place more emphasis on meaning, reflection and the context of the experience, rather than just simply communicating facts.

**Mobile-driven Applications in Sustainable Tourism and Interpretation**

Smartphone technologies and mobile software applications available today offer vast options catering to tourists’ communications, information and social-connectivity needs whilst travelling (Dickinson et al., 2014; Wang & Xiang, 2012). Advanced mobile services and network capabilities allow for rich multimedia content and interactive social communications which are changing the way visitors encounter and evaluate tourism experiences (Peres, Correia & Moital, 2011; Wang & Xiang, 2102). Mobile-driven applications in tourism and interpretation includes, but is not limited to: (1) mobile searches, (2) location-based, navigational or mapping services, (3) user self-reservations/check-ins, (4) barcode and quick response (QR) code scanning, (5) social communications, (6) language assistance, (7) currency conversion, (8) entertainment or edutainment multimedia, and (9) destination guides and recommender systems (Wang, Park, & Fesenmaier, 2011; Wang & Xiang, 2012). Tan, Foo, Goh and Theng (2009) had emphasize the importance of developing mobile applications that caters to usage needs of tourists, stating the need to have a detailed contextual understanding of tourists’ usage patterns, informational retrieval goals and commonly executed tasks. The authors recommended five contextual information needs (TILES) that should be considered when designing suitable context-aware applications: (1) temporal, (2) identity, (3) location, (4) environmental, and (5) social. Dickinson et al. (2014) similarly highlighted the need to consider the temporal-, spatial- and place-related capabilities of mobile applications since these enabled visitors to obtain real-time information, and allowed them to “visualize the spatial relativity of tourist facilities, resources and activities, (leading) to knowledge-rich visitors” (p. 15). This in turn can create opportunities for customization of travel planning and highly personalized visitor experiences.

Despite the ubiquitous adoption of mobile-driven technologies and applications, current research on mobile-driven technology and software applications have been predominantly focused on the overall touristic experience or usage preferences in general; rather than specifically within the context of environmental interpretation, sustainable tourism experience and conservation learning outcomes. Hence, there is considerable opportunity for exploring mobile-driven applications within this context, particularly if measured in conjunction with the principles of mobile learning. Liaw, Hatala and Huang (2010) described mobile learning using the activity theory approach, in which they portrayed learning as a mobile activity; and emphasized that it should not be detached from other forms of learning activities and educational objectives. The authors’ framework for effective mobile learning posited that active learning is an amalgamation of learners’ (1) control of learning, (2) context of learning, and (3) communication of learning. This emphasis on contextual learning was supported by Westera (2011), who suggested that learning should not take place in a vacuum; and that new learning technology should mediate and facilitate,
situated contextual learning to enrich visitors’ interpretive experiences and learning activities. To achieve specific learning outcomes, mobile-driven applications and content should be planned and designed for (1) different devices/mobile platforms, (2) different learning spaces and context, (3) multiple learning tasks and knowledge goals, (4) learner mobility and familiarity, and (5) better accessibility, usability and learnability (Ozdamlı and Cavus, 2011; Parsons & Ryu, 2006; Wang & Shen, 2012; Westera, 2011). These conditions are necessary to ensure efficiently organized interactive components within mobile-driven applications that facilitate optimal integration and successful implementation.

The Tourism Experience as a Transformative Learning Process

Minnaert (2012) had discussed the notion of tourism as an educational experience, in which tourists may experience meaningful and personal development to facilitate learning and encourage behavioral change. Experiential learning encompasses a holistic process or cycle of affective, reflective and action oriented activities in which knowledge creation facilitates a transformative experience (Abe, 2011; Minnaert, 2012). Kolb (1984) had posited that effective experiential learning involves a holistic process or cycle of activities in which knowledge creation is achieved through a transformative experience. His experiential learning cycle model illustrated a learner’s journey through four stages: (1) concrete experience – i.e., direct sensory experience, (2) reflective observation – i.e., inward reflection and personal meaning, (3) abstract conceptualization – i.e., logical analysis or developing new concepts, and (4) active experimentation – i.e., adopting new behavior and external actions. McLeod (2013) had further suggested that to ensure a holistic learning experience, there is a need to recognize that learning (1) is a process, not an outcome, (2) should be grounded in experience, (3) necessitates real world adaptation, (4) adapts both concrete and abstract information, (5) involves people interacting with others and their surroundings, and (6) creates knowledge.

Related to the concept of experiential learning, researchers have likewise discussed the value of transformative learning in creating meaningful learning experiences and outcomes. Mezirow (1996) had defined transformative learning as “the process of using a prior interpretation to construe a new or revised interpretation of the meaning of one’s experience in order to guide future action” (p. 162). It was referred to as a process of effecting alterations to an individual’s frame of reference whereby habits of mind (i.e., broad orientations and habitual ways of thinking, feeling or acting) and points of view (i.e., assemblage of beliefs, value judgments and attitudes) are fundamentally altered as a result of critical reflections and challenges to established assumptions during the learning process. Sipos, Battisti, and Grimm (2008) proposed a transformative learning process for sustainable tourism in which visitors learn and change as a result of the lived-experience. The authors proposed a model of sustainable transformative learning, which consisted of learning activities involving the (1) Head (engagement – cognitive domain: e.g., intellectual and conceptual knowledge), (2) Hands (enactment – psychomotor domain: e.g., practical or skill-based activities), and (3) Heart (enablement – affective domain: e.g., values, attitudes and behavior modification). It is posited that learning objectives designed in congruence to the cognitive–psychomotor–affective trilogy facilitates a holistic and personalized learning experience, which results in “profound changes in knowledge, skills and attitudes related to enhancing ecological, social and economic justice” (Sipos et al., 2008, p. 69). Mezirow (2000) similarly discussed the importance of “making meaning as a learning process” (p. 3) in which (1) contextual understanding, (2) critique of assumptions, (3) authenticating meaning, and (4) justifications of reasons were implicit for mindful transformational learning. The author had viewed transformation as a progress (over time) of “reformulating reified structures of meaning by reconstructing dominant narratives” (p. 19).
Taylor (2007) had surmised that if implemented effectively, transformative learning enables the meaning and sense-making process in learning, particularly in enabling paradigmatic shifts. However, to do so, there is a need to (1) create personalized and direct learning experiences which are engaging and inspire experiential reflection, (2) identify a strong catalyst for change, (3) acknowledge the influence of different learning contexts, (4) recognize diverse learning situations and ways of knowledge acquisition, and (5) develop peer-learning relationships which encourage dialogue and sharing. Parallel to Mezirow’s (2000) and Sipos et al.’s (2008) models of transformative learning, Mayo (2010) had discussed the action–reflection–transformative action process, in which he warns that action on its own, disconnected from reflection will not result in mindful transformative learning and behavioral change. Conversely, reflection without action will also result in mindless, empty theorizing; both of which serve little purpose.

METHOD

While there have been a multitude of digital and mobile-driven applications launched to date, there is still limited research to assess its effectiveness in achieving sustainability and conservation learning outcomes. Thus, a study of this nature is timely and useful. There is a need assess the effectiveness and efficiency of such applications in environmental interpretation towards desired environmental education and transformative learning outcomes vis-à-vis traditional (e.g. static/physical and guided) interpretive tools utilized. The aim of this explanatory study is to investigate the application of mobile-driven applications in comparison with traditional interpretive techniques for environmental interpretation, visitor education, sustainable transformative learning and conservation advocacy. The objective is not to merely describe current mobile-driven applications and usage within the tourism phenomenon in general. Instead, it aims to measure the effectiveness and efficiency of such applications towards specific sustainable transformative learning outcomes. To do so, there is a need to investigate the interactive forces, attitudes or practices that shape the phenomenon. The adoption of an explanatory qualitative research approach provides a flexibility and intrinsic openness from which a contextualized understanding of participants, perceptions and motivations can be obtained. To measure the effectiveness of the various interpretive techniques within the tourism experience, assessment indicators comprising of cognitive, affective and conative responses from informants were investigated to determine transformative learning outcomes.

Research data were collected from field trips to a nature-based attraction in Singapore, by a group of (85) undergraduate students taking a sustainable tourism module. During the site visit, informants were asked to undertake all three types (mobile-driven, static/physical and guided) of interpretation, and record their experiences on a semi-structured interview pro-forma. Following the field trip, informants were asked to share their post-trip reflections on an online forum via the module’s electronic learning management system. Subsequently, three focus group interviews were conducted to let informants share their experiences and learning reflections. As discussed, effective interpretation can aid transformation through inducing an in-depth understanding of the attraction, and consequently encourage greater conservation and sustainable ethos. Additionally, the link between perceptions, actions, and reflection had been discussed in the preceding discussion on experiential and transformative learning; as well as issues relating to effective technologically- and mobile-enhanced learning situations. Thus, exploring the causal relationship between the different interpretative techniques and meaningful visitor experiences can contribute to more effective visitor management strategies, future visitor intentions and encouraging environmentally sustainable behavior.
RESULTS

Mobile-driven, Physical and Guided Interpretative Experiences

As part of the field trip activity, informants were required to engage in all three forms of interpretive experiences – mobile-driven, static/physical and guided; and record their responses on the pro-forma comprising of 12 questions categorized into pre- and post-activity questions. Following the field trip activity, informants shared their post-trip reflections on the online forum and three focus group interviews were conducted to allow an in-depth discussion and peer sharing of informants’ reflections and narratives. When asked about which interpretive experience they enjoyed the most, the majority (61%) of informants had cited physical/static interpretation; while 21% preferred the technologically- or mobile-driven interpretation and 18% preferred the guided encounters. Conversely, for the question on which interpretive experience they enjoyed the least amongst the three different techniques, 68% cited technologically- or mobile-driven interpretation, while 23% cited guided interpretation and 9% the physical/static interpretation. Informants who preferred the physical/static interpretation felt that the physical/directional signage, park brochures, maps and information boards around the park were sufficiently detailed and had engaged their senses through the pictures and exhibits. They were also able to connect the descriptive explanations with the surrounding flora, fauna and natural/cultural heritage; as well as understanding the appropriate behavior they should adopt to avoid damage or negative impacts on the environment. Informants who did not enjoy the physical/static interpretation stated that the information presented on the signboards were too exhaustive and boring; and some were placed in locations that were not convenient to view (e.g., low on the ground) and/or had not been properly maintained (e.g., faded displays or covered by foliage and organic waste).

Informants who enjoyed the guided interpretation had predominantly valued the human-interaction aspect. A few had shared that their personalities as “a people person” meant that they benefitted most from the interpersonal connections and interesting analogies. The guided tours allowed them to also ask questions and receive explanations about the specific flora and fauna encountered. Informants had also cited the ability to interact with other visitors and hands-on learning with their peers as positive points during the interpersonal experience. In contrast, informants who disliked the guided interpretation had highlighted a lack of interaction and connection with the nature guide. Some had felt that the guide was not able to tailor interpretation to their individual needs, and/or adapt the content to the profile of the visitors. A few who were in a group that was too large also felt that they had benefitted little from the experience due to the group size (not able to hear the guide clearly). A number of informants had additionally suggested the use of audio guides – which would allow them to enjoy and explore the park at their own pace, whilst at the same time be able to retrieve audio commentary at each trail point.

Finally, for informants who most preferred the technologically- and mobile-driven interpretation, most had narrated features such as interactivity, availability of information “at the finger tips”, graphics and videos as providing the most interesting engagement. Additionally, features such as mobility and navigational tools, and information on trail points and attractions were also deemed beneficial. They felt that those features helped them to save time and find their way around the park easily. In contrast, those who preferred not to use the applications shared that they had difficulty understanding or navigating the technology or had not bothered to download the needed applications for their mobile devices. Some informants had shared that since they were in a natural setting, they preferred to appreciate, experience and engage with mother-nature, instead of focusing on technology. Regardless of their most or least preferred interpretive experiences, informants were additionally asked to share which aspects they liked best and least about using the mobile applications. Reflections on best features facilitating a meaningful experience include: (1) being able retrieve detailed information prior to the site visit; (2) mobility and portability of information; (3) in-depth information on content they are interested in; (4) interactive audio-visual
content; (5) location-based/GPS and navigational tools in real time; (6) mobile trails (categorized into different themes/experience types) and photos/explanations about trail points; (7) user-friendly and easy-to-navigate software; (8) social networks and the special interest groups section; (9) “check-in” and sharing on social media; (10) current promotions and activities happening at the park; and (11) locations and distances of nearby landmarks and amenities. A number of informants had also indicated that the mobile application helped them to be sustainable and “save the earth” as there is no need for printed brochures and maps. Reflections on negative features that hindered their visit experience include: (1) long lag time and difficulty in loading content; (2) high data usage due to broadband connectivity; (3) reduced battery life due to extended usage of the mobile device and broadband connection; (4) content was “too small” and/or too much information to read; (5) difficulty in viewing the content due to small screen size of mobile devices and/or external environment such as glare from sunlight; and (6) lack of interpersonal connection.

When asked if they thought that the mobile-driven interpretive experience provided a more meaningful learning experience compared to the other interpretive activities, only 32% said yes, while 68% said it did not. Informants who said no, had predominantly shared that while the application was informative and provided in-depth understanding and convenience of content retrieval, they preferred to appreciate the natural surroundings. Many had shared that instead of spending time on reading the information, they preferred to “be there” and bond with their peers and the environment. Informants who said yes, felt that the applications helped them to customize and personalize their experience at the park, since they could conveniently retrieve information and undertake activities they were specifically interested in at their own pace. Content was also seen to be more updated, compared to static displays. In particular, they valued the real-time navigational features and interactive content offered by the applications. Beyond on-site applications, the majority of informants (including those who said no) had cited the value of being able to read up on and learn about the park prior to the site visit. This enabled them to not only plan their visit and decide on the attractions/activities they wanted to experience whilst there, it also helped them understand the “do’s and don’ts” they should be conscious of.

With regards to their post-visit reflections, the majority of informants shared that the field trip had changed the way they understand and feel about nature and the environment. Even though almost all of them had had been to the park on previous visits, they shared that they had learnt and discovered significantly more about the park and its flora and fauna than they had before. One of the key reasons for this was that on this visit, they were there with a specific learning objective in mind, and had thus paid specific attention to their surrounding and information encountered. Through active, mindful participation with the interpretive activities, they were particularly conscious of the sustainability efforts implemented at the park, as well as the impacts of their own behaviors on the natural environment. A number of informants had even shared that this experience had “opened their eyes” to the peaceful, natural treasure right at their doorstep; and it made them reflect on how they should better appreciate the country’s natural heritage and conserve it, instead of seeing it as just a resource for their pleasure and utilization. Through the field trip activities, post-trip reflections and peer-sharing about their experiences, informants felt that they had discovered and learnt much more about the flora, fauna and natural habitat than they had on previous visits. This in turn helped them to understand and appreciate the rationale and importance for its conservation.

iExperience, iLearn, iConserve: A Sustainable Transformative Learning Trilogy

The above findings and literature reviewed highlighted the role that effective interpretation and meaningful tourism experiences can play in promoting environmentally sustainable behavior through positive messages, self discovery and transformative-experiential learning. While there have been numerous approaches from which interpretation has been defined, there is a common consensus that interpretation should not merely be about presenting factual information; it should

64
be an interesting and educational activity directed towards communicating meaningful relationships, discovery of new knowledge and inspiring future affirmative action (Ham, 1992; Weaver, 2008). However, with the vast technological and software options available today, being able to accurately determine which applications are considered as value-add is difficult, particularly within the tourism context with its heterogeneous visitor profiles. Technologically- or mobile-driven applications should not be planned or developed in isolation, but as part of an integrated multi-platform interpretive program. As suggested by Isacsson and Gretzel (2010), the achievement of high quality learning experiences require a synergistic management of the (1) technological tools, (2) pedagogically-sound practices, and (3) contextual- and cultural-ecology of the topic being communicated.

In addition to the above considerations on the different interpretive applications utilized, there is also a need to consider the experiential conditions and learning situations encountered. As seen from the literature and narratives articulated, experience alone does not automatically lead to an engaged learner. There is a need for individuals to assess, reflect on and analyze that experience vis-à-vis their own perceptions, frames of references, goals or expectations. As observed by Pugh (2002), people experience transformative learning when “they actively use a concept (and) finds that it allows them to see aspects of the world in a new way, and personally value this way of seeing” (p. 1104). Within the context of this study, cognitive reflection and critical self-appraisal had allowed informants to reflect on what has been learnt, what new knowledge has been discovered, and how it relates to them personally; and from thereon, examine how they can alter their own future intentions, perceptions and actions. To ensure long term pro-conservation ethics and environmental consciousness, interpretive programs need to balance the cognitive, affective and behavioral stimulation vis-à-vis the different interpretive experiences. As aptly quoted in a much used phrase by Benjamin Franklin, “Tell me and I forget, teach me and I may remember, involve me and I learn”. Thus, the key to sustainable transformative learning is ongoing engagement, reflection and discovery.

CONCLUSION

To enable the effective design and implementation of environmental interpretation, there must be meaningful assessment of its effectiveness as well as progression towards the achievement of sustainable learning outcomes. This study was undertaken to investigate the application of mobile-driven applications in comparison with traditional (physical/static and guided) interpretive techniques for conservation education and sustainable transformative learning. To design effective interpretive programs and transformative learning experiences towards conservation, site managers need to develop messages that facilitate the connection between visitors’ previous experiences, on-site experiences, the physical surrounding and core issues being interpreted (Ballantyne et al., 2008). Tourism managers need to adequately understand the foundations of human learning in order to enable effective and meaningful transformative learning outcomes during tourism experiences. In adapting transformative learning for sustainable tourism, it is posited that visitors can learn and change through the lived-experience, whereby learning designed in congruence to a cognitive–psychomotor–affective experience (Sipos, Battisti, & Grimm, 2008) and action–reflection–transformative process (Mayo, 2010) can facilitate a holistic, personalized and cathartic learning experience. Thus, mobile-driven applications should ensure that messages and content are developed with the audience and learning conditions and/or context in mind, rather than be overtly focused on the technological aspects (Parsons & Ryu, 2006). Attention should be paid to the pedagogical, social and human-technology interaction aspects. The synergistic integration of technological features with suitably designed contextual content and vivid, emotive narratives or stimulating visuals can enhance cognitive information being presented to promote sustained long-
term conservation intentions and attitudinal transformations.

REFERENCES


