The impact of digital technology affordances on visitor experience: a pilot study

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This paper presents research undertaken on the VISTA AR project (Interreg FCE programme). The project focuses upon the affordances (Pozzi *et al* 2014) of digital technologies, and their relationship to visitor experiences mediated through innovative business models for cultural heritage sites.

The case study presented in this paper (Exeter Cathedral) recognises the symbiotic relationship between religous sites and tourism (Francis et al, 2010) and their significance as tourist attractions (Bond *et al* 2015). Indeed, previous research (Shackley, 2003) noted in excess of 30m visitors per annum to 43 Anglican cathedrals in England. Tourism is economically important to the UK (£121.1bn, 7.1% GDP). However, attrition rates have been observed: bed-nights fell by 8% (2013-14); -3% day visits (2014-2015); 136m day visits in the South West (-7% 2014-15) with only 8m attending a visitor attraction. There is therefore significant opportunity for economic impact by attracting additional visitors to cultural heritage sites.

To address this challenge, the project was concieved to evaluate the impact of advanced digital technologies on visitor experiences and the potential to attract additional and repeat visitors. The ability to attract repeat visitors rests in the affordances of digital technologies to permit new, innovative, interpretations of cultural heritage artefacts. This is enabled through liquification, rebundling, and moving from consumer perspectives to co-producer perspectives (Normann, 2001). An immersive environment, using AR/VR provides affordances of 'access' that are not possible in physical environments; for example, to interact with precious manuscripts that cannot be physically handled. In addition, advanced digital technologies provide affordances for collecting intelligence on visitor preferences, behaviour and action. Technologies such as geospatial tracking to determine dwell time and visitor journeys; Text Analytics (TA) algorithms to evaluate visitor feedback; voice recognition systems to provide affordances for collecting feedback at the convenience of the visitor.

To provide a baseline for evaluating these technologies a pilot study was undertaken. The objective of the study was to capture the customer journey, dwell-time, and gaze-time with respect to specific artefacts. Data was collected using a pre-visit questionnaire (demographic and psychographic data); in-visit eye-tracking against areas of interest; post-visit experience score and verbal feedback. The sample was split into two equal groups with (and without) an audio guide (WAG/NAG respectively). The development of eye-tracking technology enables a non-invasive approach to physiologically measure eye movements. The prominent method is the pupil-and-corneal-reflection method (Holmqvist *et al.*, 2011). Tobii Pro Glasses were used incorporating an illuminator that emits infrared light into the eyes to create a glare pattern, which is computed through complex algorithms and processed simultaneously with a video recording from the perspective of the participant.

Heat maps provided the distribution of gaze duration for an artefact. These are indicative of visual attention and interest. The results identify significant variance between groups, and indicate the importance of interpretation to mediate between artefact and gaze time. For example, comparing WAG/NAG for three artefacts: Great West Window (60.57s/1.36s); Minstrel's Gallery (11.75s/2.69s); Scott's Sledge Flag (8.40s/1.41s). The results also indicate the importance of signalling a clear customer journey.