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THE CONTRIBUTION OF GEOLOGICAL FEATURES TO VISITOR EXPERIENCES: COMPARISON BETWEEN TWO GEOTOURISM ATTRACTIONS IN SOUTH AFRICA

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Abstract: Geotourism offers the opportunity to promote geoconservation as well as an understanding of geoheritage and -diversity. Though sites may have high quality geological resources, visitors to these sites have varied interests and motivations to visit. As such, the geological features of an attraction may make varied contributions to visitors' experiences. Understanding these differences will aid in determining how specific features should or could be enhanced to facilitate the most appropriate experience dimensions. Aspects such as the content, learning, visitor management and fulfilment are argued to be especially relevant in the geotourism context. This paper explores these perception in the case of two diverse geosites namely the Augrabies Waterfall and Cradle of Humankind, South Africa. Results indicate how specific geological features and representation thereof contribute differently to visitors' experiences. Recommendations for future research are made.

Keywords: geotourism, geological sites, tourist experiences, measurement scale, Augrabies National Park, Cradle of Humankind.

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INTRODUCTION

Africa is endowed with rich natural and cultural resources ideal for the promotion of the tourism industry in countries faced with numerous challenges to do so (Jacinto & Du Preez, 2018). The continent boasts some of the world's major geosites (Anhaeusser et al., 2016), yet limited measures seem to be in place to protect and promote awareness of continental geoheritage (UNESCO Global Geopark data presented in Ruban, 2017). Tourism activities are one way in which national geodiversity can be exploited (Ruban, 2017). Despite the suitability of geotourism as a product offering for African destinations as well as its potential to contribute to socio-economic development (Farsani et al., 2011; Mukwada & Sekhele, 2017; Ngwira, 2015; Schlüter & Schumann, 2018), academic literature representing the African geotourism perspective is scant (Ruban, 2015).

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First introduced publicly in 2002, geotourism is a relatively new type of tourism with growth potential (Farsani et al., 2011; Hose et al., 2011; Mukwada & Sekhele, 2017; Ngwira, 2015), and is defined as "tourism of geology and landscape usually undertaken at geosites. It fosters conservation of geological attributes (geoconservation) as well as understanding of geoheritage and geodiversity (through appropriate interpretation)" (Dowling & Newsome, 2018:8). As a small-scale niche tourism product it offers unique experiences (Robinson & Novelli, 2005), and overlaps with other growing niches such as eco-, alternative-, educational-, nature-based- and heritage tourism (Dowling & Newsome, 2018; Hose et al., 2011). When only focusing on the abiotic elements (geology, landforms and climate), it can be defined as geological tourism. The wider geotourism spectrum however not only includes the abiotic, but also the biotic (fauna and flora) as well as cultural (people past and present) elements (Dowling & Newsome, 2018). People are said to engage with geology and geomorphology through landscapes and tourism in an experiential way and, as such, successful geotourism depends on the quality of the visitor experience through making it meaningful and memorable (Gordon, 2018). The question remains as to how geological features contribute to tourists' experiences at attractions (after Assaf & Josiassen, 2012). As experiences depend on both the individual and the context (Knobloch et al., 2014), there is no guaranteed format for the delivery of memorable experiences. This paper explores the manner in which geological features form part of visitors' experiences at two diverse attractions. Focus is on four dimensions of geotourism experiences namely content, learning, visitor management, and fulfilment.

LITERATURE REVIEW

Different attractions present different benefits (experiences) to tourists according to the nature of the offering, with the primary features being the drawing cards (Benur & Bramwell, 2015). Visitor expectations play an important role as individuals anticipate certain traits of the attraction visited (Larsen, 2007), and the extent to which the attraction features meet these expectations will either cause satisfaction or dissatisfaction (Mathis et al., 2016). Tourists' motivations to travel also link to their levels of satisfaction as an outcome of what they have experienced (Benur & Bramwell, 2015; Knobloch et al., 2014). These motivational factors translate into the aspects considered when measuring tourists' experiences (Pearce & Lee, 2005).

The aim of any tourist attraction should be to deliver an experience that leaves a positive memory (Chandralal & Valenzuela, 2013; Vittersø et al., 2000). Enhanced experiences involve tourists emotionally, physically, spiritually and intellectually (Prebensen et al., 2014), and comprise both tangible and intangible aspects. Various dimensions of memorable and meaningful experiences have been identified (see Chandralal & Valenzuela, 2013; Cornelisse, 2014; Hosany et al., 2015; Kim et al., 2012; Knobloch et al., 2014; Park & Santos, 2017; Poria et al., 2004; Tung & Ritchie, 2011). The more the various sub-dimensions of these dimensions are met, the greater the chance of overall memorable experience (Knobloch et al., 2014). The importance and experience of geological features will vary between visitor groups, where for some it is the focus of the visit while others engage with the content incidentally (Dowling & Newsome, 2018; Gordon, 2018; Grobbelaar et al., 2019; Hose, 2016). The characteristics of the geological features and manner in which tourists engage with content will contribute to the experience (Newsome et al., 2012). In the case of geotourism sites, aesthetics, emotional value, authenticity, uniqueness, visual value and support services apply specifically (Štrba, 2015). Other aspects known to influence satisfaction with natural and cultural resources include perceived authenticity (Cornelisse, 2014; Štrba, 2015); unusual / rarity

/ novelty (Chandralal & Valenzuela, 2013; Kim et al., 2012; Knobloch et al., 2014; Štrba, 2015); variety / diversity (Gordon, 2018; Kruger et al., 2015); identification (Kruger et al., 2015); proximity of viewing (Hose, 2002; Kruger et al., 2015). Learning and gaining knowledge is one of the major benefit sought at geosites (Hose, 2012), and visitors are likely to rate their experiences higher if they have learned something about the landscape and geology visited (Dowling & Newsome, 2018). Intellectual development through changed perspectives is regarded as one of the most significant components of memorable experiences (Tung & Ritchie, 2011), but may not be the strongest contributor (Knobloch et al., 2014). Learning is strengthened if a visitor can engage with the content of the attraction in a desirable manner (Ham, 2016). In the geotourism context, interpretation is one of the key components (Hose, 2012; Newsome et al., 2012).

Well-planned and –designed interpretation of heritage should be able to meet the needs of the range of visitors (casual to expert) at a geotourism site (Gordon, 2018; Grobbelaar et al., 2019; Hose, 2016). When interpreting geosites it is important that the descriptions should provide a holistic perspective of the site and that the geology should be clearly and easily explained. Various tools can be used toward this goal including literature, signage, tour guides, audio guides and interpretive centres (Dowling & Newsome, 2018; Newsome et al., 2012). Tourists increasingly seek meaningful experiences such as a sense of physical, emotional, or spiritual fulfillment (Kang et al., 2008) and this can be achieved through broadening one's thinking of life and society (Chandralal & Valenzuela, 2013; Uriely, 2005). When meaningfulness is enhanced, experience will become more memorable and likely to last longer (Park & Santos, 2017; Tung & Ritchie, 2011; Tsiotsou & Goldsmith, 2012). Geosites offer tourists the opportunity to experience fulfilment through deep connections with places, humanity and the natural world (Gordon, 2018). Interactive engagement with and interpretation of content is necessary to foster these deeper meanings (Gordon, 2018; Poria et al., 2001).

STUDY AREAS

South Africa features a great variety of geological wonders; with some already developed into tourist attractions (Knight et al., 2015). Two study areas with significant geosites in diverse settings were chosen: Augrabies Waterfall in the Northern Cape and Cradle of Humankind in the province of Gauteng, South Africa. Augrabies is a 56m waterfall in the Orange River with a name derived from the Nama word "Aukoerebis" meaning the "Place of Great Noise." It is an undoubted geotourism attraction (after Ortega-Becerril et al., 2019; Schutte, 2009) and can be viewed within the 820 km² Augrabies Falls National Park (Figure 1). The area forms part of the Namaqua-Natal tectonic Province (Colliston et al., 2015) and features and offerings within the Park's 55 383 hectares include the waterfall (Figure 2), gorge (Oranjekom and Ararat as main viewpoints) (Figure 3); rock formations with Moon Rock (Figure 4) and Swart Rante (Black Hills) (Figure 5) as prominent features; panoramic viewpoints; cultural heritage sites (Early, Middle and Late Stone Age; San and Khoi; first European settlers); fauna and flora; as well as some leisure activities (Pinchuck et al., 2002). The Falls were thought to be formed some 1.8 million years ago, progressively cutting back along faults in the Riemvasmaak gneiss of Proterozoic age. Rocky hills in the central portion are said to be formed by dark quartz-rich granulite and metagabbros, and the metagabbros is composed of dark minerals (amphibole, biotite). The Augrabies gneiss consists of microcline and plagioclase with varying amounts of biotite and hornblende and with rare opaque minerals (apart from allanite which is a common accessory mineral). The Augrabies Falls area is also characterized by faults, micro-faults, and parallel joint sets (Madi, 2016). The Cradle

of Humankind (Figure 6), one of South Africa's eight UNESCO World Heritage Sites, is the world's richest hominin site housing around 40% of the world's human ancestor fossils across 13 major fossil sites within the 47 000 hectares of land (Norman, 2013; Schutte, 2009). The two most visited sites are the Maropeng Visitor Centre and Sterkfontein Caves. Maropeng with its signature building known as the Tumulus (Figure 7) houses an exhibition centre taking visitors on a journey of discovery to learn more about, and challenge thinking around the origins of humankind (Lelliott, 2016). Visitors have the opportunity to view original hominid and dinosaur fossils, as well as ancient artefacts such as 2-million-year-old stone tools.

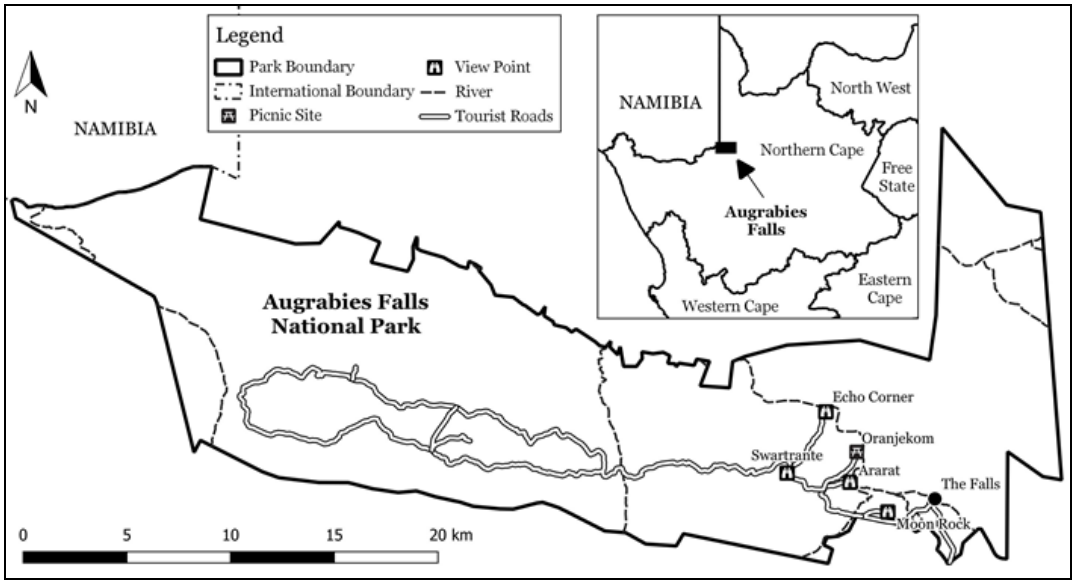

Figure 1. Map of Augrabies National Park

Figure 2. Augrabies Waterfall

Figure 3. Oranjekom and Ararat

Figure 4. View from Moon Rock

Figure 5. View of Swart Rante (Black Hills)

Maropeng is a short drive from the fossil-rich Sterkfontein Caves and visitors usually combine these two sites (Schutte, 2009). Sterkfontein Caves formed in the 2.6 Ga dolomitic limestone of the Malmani Subgroup and contains the richest repository of Australopithecus fossils in the world (Stratford, Merlo, & Brown, 2016). Two historically significant fossils among others found in the area are that of "Mrs Ples" and "Little Foot". The 2.5-million-year-old australopithecine skull known as "Mrs Ples" (Australopithecus africanus) provided proof that Australopithecus could be classified as a member of the Hominidae (replica at Maropeng displayed in Figure 8). "Little Foot" is an almost complete australopithecine skeleton aged around 4.17 million years (replica at Maropeng displayed in Figure 9) (Schutte, 2009). On a guided underground tour of part of the cave system (Figure 10, 11, 12), account is given of how the fossils were found (Norman, 2013). Neither the excavation sites for "Little Foot" (Figure 13) nor "Mrs Ples" (Figure 14) are accessible to visitors as work continue across the cave network (Stratford, et. al., 2016). After eighty years of paleoanthropological research, many areas of the cave system remain either unexplored or only superficially sampled (Stratford, 2018); implying continued geological tourism potential. Though scientific findings have been published on the area and it holds geotourism potential (Schutte, 2009), there is a dearth in literature from a visitor perspective (Lelliott, 2016).

MATERIALS AND METHODS

Data were collected using self-administered questionnaires in face-to-face interactions with visitors over three days at both sites. Non-random sampling was employed to solicit individuals through interception at various key points across the attractions.

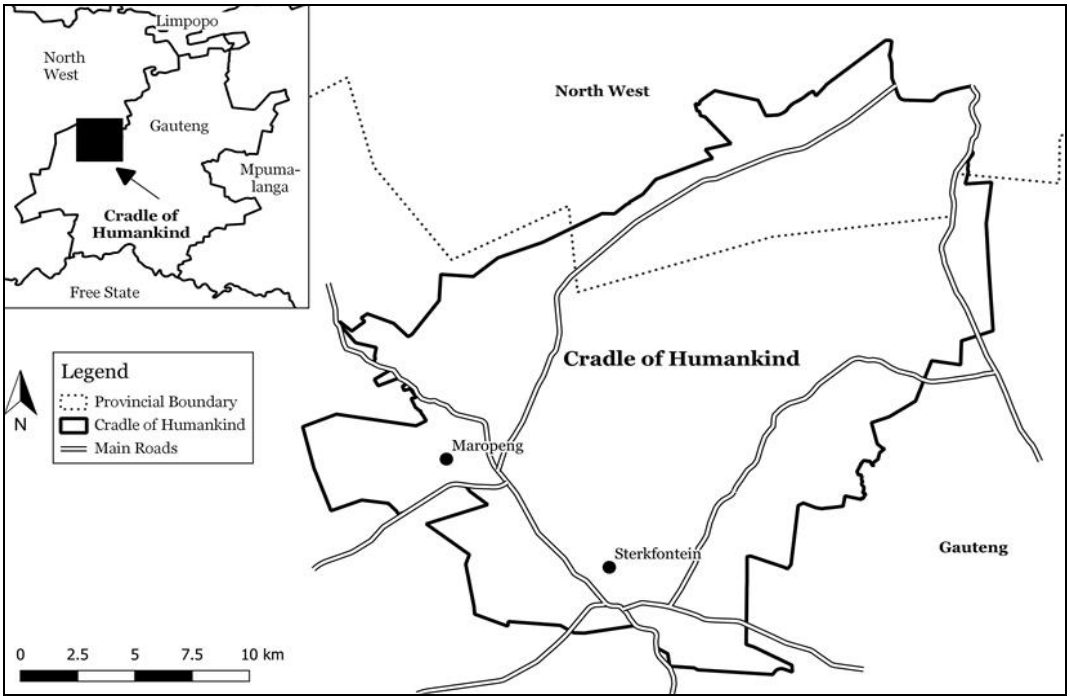

Figure 6. Map of Cradle of Humankind indicating Maropeng and Sterkfontein

Figure 7. Maropeng visitor centre main

Figure 8. Replica of „Mrs Ples"

Figure 9: Replica of „Little Foot"

Figure 10. Cave tour entrance

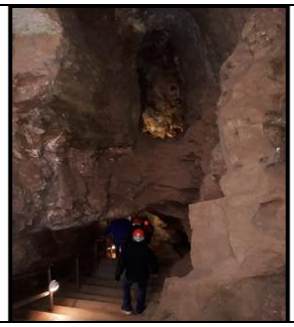

Figure 11. Descent

Figure 12. Cave exist with bust of Robert Broom and Mrs Ples

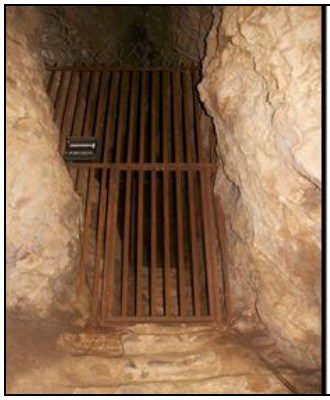

Figure 13. „Little Foot**"** excavation site

Figure 14. „Mrs Ples" excavation site

In case of Augrabies this included viewpoints and hospitality areas such as picnic sites and restaurants. At CH data collection took place at both Maropeng and the Sterkfontein Caves but ensuring that visitors were not included twice. Interaction took place throughout the various exhibitions and hospitality facilities. At both attractions, fieldworkers aimed to collect a heterogeneous sample based on age, gender and race, as well as approaching visitors after they had spent enough time to be able to evaluate their experiences. The questionnaire contained a section on demographics and frequency of visit (categorical), as well as visitors' 'top-of-mind' thoughts of the attraction (open-ended; analysed through thematic analysis). Twenty items (derived from literature) were used to measure the four dimensions of tourists' experiences: 'content' (six items), 'learning' (6 items), 'visitor management' (five items) and 'fulfilment' (three items) (agreement measured from 1 = strongly disagree to 5 = strongly agree). Specific features of each site were identified from the attractions' websites and respondents had to indicate whether they had experienced these (yes/no), as well as rating their experience of these features (1 = extremely negative to 5 = extremely positive). Lastly they had to indicate which aspects of the attraction contributed to making their visit memorable (1 = not contributing at all to 5 = contributing greatly). Descriptive data analysis described the samples and responses to the various questions. Exploratory Factor Analyses (EFA) (Maximum Likelihood extraction with Varimax rotation) identified factors emerging for the constructed 20-item tourist experience scale (EFA conducted for combined dataset).

Suitability of the data for EFA was investigated at the hand of Bartlett's test of sphericity (significant at 0.05 or smaller) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (exceeding 0.6). Factors that reported Eigenvalues of 1 or more were retained. A cut-off of 0.3 for factor loadings was used (Pallant, 2016).

Reliability of the various factors were tested using Cronbach Alpha (coefficient > 0.60) (Taber, 2017). The four factors were then applied to determine the differences in ratings between the two attractions (reliability of the applied scale confirmed using Cronbach Alpha). Significance of the difference in ratings of the experience dimensions between parks were tested at the hand of t-tests (p=0.05) (Pallant, 2016).

RESULTS DISCUSSIONS

The results sections consist of three parts. Firstly, descriptive results for the samples and evaluation of site-specific features per park, followed by EFA of the experience scale and lastly, comparing the ratings of the experience dimensions between the attractions.

Sample description

The total sample included 307 respondents: 107 for Augrabies Falls National Park (ANP) and 200 for Cradle of Humankind (CH) (of which 159 were from Maropeng Interpretation Centre and 41 Sterkfontein Caves. Majority of respondents at ANP were male (62%), aged between 36 -50 (51%), with a secondary school/matric qualification (37%), domestic travellers (94%), day visitors (68%) and repeat visitors (82%). Majority of the respondents at CH were male (51%), aged between 36 – 50 (46%), with a postgraduate degree (34%), domestic travellers (72%), day visitors (89%) and first time visitors (61%).

Evaluation of geological features experienced at ANP

Visitors' 'top-of-mind' connotations with the park included the waterfall (48 mentions); nature (9); animals and birds as well as monkeys/baboons (8). Reference was also made to the peace / tranquillity / beauty of the surroundings. Also mentioned were the rock formations, people/party, and the swimming pool (keeping in mind that a large contingency of the respondents were local repeat visitors that frequent the park as recreational facility). Respondents were asked to rate the performance of specific geological features that they have experienced. Table 1 depicts these features, the percentage of visitors that have experienced them as well as the mean score (with five being the upper-end of the scale). The vast majority of visitors have experienced the waterfall, also giving it the best score. This is followed by the two prominent rock formations 'Swart Rante' (Black Hills) and 'Moon Rock'; with the former given a greater score despite being the least experienced than the three remaining features (the last two being viewpoints). Overall, respondents' experience of the geological features were extremely positive.

Table 1. Performance of site features: ANP*

Specific features	Experienced (%)	Performance (Mean score)
The Falls	98	4.49
Swart Rante (Black Hills)	38	4.31
Moon Rock	50	4.27
Oranjekom & Ararat	48	4.26
Echo Corner	48	4.24

Table 2. Aspect contributing to an overall MTE: ANP

Aspect	N	Mean
Rock formations	105	3.88
The landscape	105	3.82
Culture and heritage	103	3.66
Plants	103	3.64
Trees	104	3.60
Birds	103	3.58
Animals	104	3.49

Respondents had to indicate the aspects they felt contributed to having an overall MTE (depicted in Table 2). In line with the performance scores, the rock formations and landscape featured stronger than cultural and biotic aspects (after Dowling & Newsome, 2018). Though the latter featured relatively stronger than the rock formations as 'top-of-mind' thoughts, they contributed less to an overall MTE; arguably alluding to the perceived quality or uniqueness of the geological features compared to other aspects once experienced. This corroborates literature indicating that aspects leading to satisfaction with natural resources include perceived authenticity (Cornelisse, 2014) and

unusual/rare (Chandralal & Valenzuela, 2013; Kim et al., 2012; Knobloch et al., 2014). Interestingly, the items given did not contribute that much to the memorable tourism experience overall (based on relatively lower mean scores). This may be that many of the respondents were day visitors who visited Augrabies for recreational purposes. As such, other components of MTEs such as hedonism and refreshment may become more important (Kim et al., 2012) and the visitors engage with geological content incidentally (Dowling & Newsome, 2018; Gordon, 2018; Grobbelaar et al., 2019; Hose, 2016).

Evaluation of geological features experienced at CH

Visitors' 'top-of-mind' descriptors included evolution / beginning of humankind / where do we come from (50 mentions); history (43 mentions); and skulls/fossils/Mrs Ples (40). Least used were interactive / entertaining / interesting (19) and being a 'cradle' and the caves (16) (keeping in mind that the majority of visitors were interviewed at Maropeng). Respondents were asked to rate the performance of specific geological features and exhibitions that they have experienced.

Table 3 depicts these features, the percentage of visitors that have experienced them as well as the mean score (with five being the upper-end of the scale). Overall, respondents' experience of the features were extremely positive. Three of the four highest rated aspects reflect the 'top-of-mind' descriptors, presenting 'evolution' were rated highest (corroborating the findings of Stratford, 218); arguably indicating successful messaging of the main purpose of the attraction (after Larson, 2007). Similar to the rock formations at Augrabies, the caves received a very high score despite being one of the least mentioned aspects associated with the attraction. Though the visitor centre were the most visited, it received a lower rating. This could link to the low use of descriptions such as interactive / entertaining / interesting.

Table 3. Experience of specific features: CH

Specific features / exhibitions	Experienced (%)	Performance (Mean score)
Beginning of the world (Maropeng)	81	4.48
Cave interior (Sterkfontein)	61	4.37
Path to humanity (Maropeng)	82	4.36
Mrs Ples and Little Foot (Replicas at both Maropeng and Sterkfontein)	63	4.31
What makes us human (Maropeng	80	4.29
Museum fossil exhibition (Maropeng temporary displays)	61	4.27
Excavation sites (Sterkfontein)	57	4.25
Homo Naledi fossil display (Maropeng)*	55	4.18
Pathway to caves (Sterkfontein)	62	4.16
Sustainability (Maropeng)	78	4.13

*Fossils of a newly found species, Homo naledi, on display at time of the survey

Homo naledi (Maropeng), pathway to the caves (Sterkfontein) and Sustainability exhibition (Maropeng) received the lowest performance ratings (despite the caves itself receiving a high rating). Though the findings of a new species, Homo naledi, were a historical event and the fossils temporarily on display, it received a relatively lower score. Pathway to the caves is a 200 meter cement path with information plaques displayed along the way. These two ratings allude to importance of the desired format of engagement with the content and would require further investigation to understand shortcomings in the existing versions (Ham, 2016). The 'sustainability' exhibition forms the last part of the exhibition hall, received the lowest score and also didn't feature in the

'top-of-mind' connotations with the attraction. Greater emphasis or alternate ways of presenting this theme would be necessary to ensure geoconservation and sustainable resource use as key outcomes of geotourism (Dowling & Newsome, 2018).

Respondents had to indicate the aspects they felt contributed to having an overall MTE (depicted in Table 4). Respondents had positive sentiments regarding the contribution of the aspects to an overall memorable experience.

Table 4. Aspect contributing to an overall MTE: CH

Aspect	N	Mean
Knowledge: origin of humans	185	4.40
Knowledge: history of mankind	185	4.30
Awe at the age of the Earth	185	4.17
Knowledge: archaeological sites	185	4.16
Connectedness to humankind	185	4.04

Table 5. EFA results for experience factors (overall dataset)

Factor Matrix[a]				
Experience factors*	Factor			
	Content	Learning	Visitor management	Fulfilment
1. Surprised by unusual things	.311			
2. Guided by rules to behave appropriately	.397			
3. See different kinds of animals/species/exhibits	.398			
4. Experience wildlife/nature in its natural state	.435			
5. Come as close as possible to wildlife/nature/artefacts	.574			
6. Am excited by viewing rare species of animals/plants/artefacts	.423			
7. Learn via engaging with other visitors		.431		
8. Learn via an articulate guide		.629		
9. Learn via talks		.817		
10. Learn via literature		.837		
11. Learn via interpretation facilities		.618		
12. Learn via audio guide		.637		
13. Receive good information (maps, brochures, signage)			.416	
14. Easily view animals/nature/artefacts in predictable locations			.501	
15. Easily view exhibits in a well-structured layout			.983	
16. Can easily move between different sightings/exhibits/ areas			.618	
17. Am able to spend as much time as I want in the same location viewing my favourite animal/plant/exhibit			.304	
18. Connect with nature				.436
19. Connect with history				1.000
20. Connect with mankind				.561
Mean	**0.423**	**0.662**	**0.564**	**0.666**
Cronbach Alpha (all factors proving reliable)**	**.801**	**.877**	**.747**	**0.684**

Extraction Method: Maximum Likelihood

a. 4 factors extracted. 24 iterations required.

* Wording was adapted to reflect the nature of the attraction (e.g. see different kinds of animals / species for ANP versus see different kinds of exhibits for CH)

** Though the Alpha for fulfilment did not meet the 0.7 threshold it could still be regarded valid (Taber, 2017).

The attraction manages to successfully facilitate learning which is regarded as a key contributor to memorable experiences (Kim et al., 2012; Tung & Ritchie, 2011), and one of the major benefit sought at geosites (Hose, 2012). It corroborates Dowling and Newsome (2018)'s statement that visitors are likely to rate their experiences higher if they have learned something about the geology visited. This finding arguably matches the visitor profile sampled, namely travellers with a high level of education (postgraduate degree) and possibly seeking intellectual stimulation; as well as being first time visitors who are 'awed' when first being exposed to the content.

Exploratory factor analysis of the experience scale

Respondents had to rate twenty aspects during their visit, with the items relating to the four possible dimensions as derived from the literature (1 = strongly disagree; 5 = strongly agree).

Table 6. Rating of experience dimensions

Experience aspects	ANP			CH			t
	N	Mean	Std Dev	N	Mean	Std Dev	
Content:							
1. Unusual things	105	4.21	.906	191	4.09	.857	1.134
2. Guided by rules	105	4.27	.847	187	4.13	.975	1.218
3. Variety	104	4.21	.910	188	4.24	.841	-.263
4. Authenticity	105	4.30	.854	189	4.07	1.153	1.761
5. Close encounters	104	4.23	.839	188	4.25	.951	-.172
6. Rarity	104	4.07	.927	189	4.31	.917	-2.131**
Composite score	105	4.21	.647	193	4.19	.684	.238
Cronbach Alpha		.822			.793		
Learning via:							
7. Engaging with other visitors	106	4.02	1.069	190	3.92	1.294	.698
8. Articulate guide	107	3.92	1.260	190	4.50	1.107	-4.152*
9. Talks	107	3.85	1.358	190	4.23	1.153	-2.527**
10. Literature	107	3.90	1.400	190	4.22	1.084	-2.183**
11. Interpretation facilities	107	3.81	1.487	191	4.20	1.103	-2.583*
12.Audio guide	107	3.91	1.634	189	4.20	1.305	-1.699
Composite score	107	**3.90**	1.143	194	**4.23**	.886	**-2.730***
Cronbach Alpha		.909			.845		
Visitor management:							
13. Good information (maps, brochures, signage)	105	4.46	.797	188	3.91	1.076	4.516*
14. Easily view in predictable locations	105	4.11	.870	178	4.09	1.268	.174
15. Easily view in a well-structured layout	105	4.21	.863	186	4.21	.961	-.001
16. Easily move between areas	105	4.36	.822	184	4.24	.848	1.197
17. Sufficient viewing time	104	4.32	.895	187	4.24	1.006	.648
Composite score	105	4.29	.636	190	4.13	.705	1.952
Cronbach Alpha		.806			.723		
Fulfilment through deep connection with:							
Nature	105	4.40	.905	188	4.26	1.040	1.151
History	103	4.05	.943	185	4.41	.881	-3.261*
Mankind	101	4.21	.983	185	4.51	.788	-2.867*
Composite score	105	**4.23**	.752	190	**4.40**	.716	-2.010**
Cronbach Alpha		.701			.686		

*p<.01 **p<.05

In order to compare the ratings on the experience dimensions (content, learning, visitor management and fulfilment), an EFA was conducted for the combined dataset. The data proved suitable for an EFA (KMO =.852; Barlett's Test p<0.0001). Maximum Likelihood analysis (Table 5) converged into the four experience factors with Eigen values exceeding 1, explaining 50% of variance. The EFA results (Table 5) indicate the items under each factor. The experience of fulfilment features strongest across the two sites (0.666), followed closely by learning (0.662). **Differences between the attractions' rating on the four experience dimensions**

As the four factors were confirmed by the EFA, they could be applied to evaluate the ratings per site. Table 6 presents the mean scores of all of the items per attraction. It also indicates the items that presented significant differences between the two attractions, as well as for the overall factors (based on composite scores). Cronbach Alpha score were also calculated for the scales per site and confirmed reliability.

Based on the composite scores of the factors the two attractions differed significantly in terms of 'learning' and 'fulfilment'; with CH scoring greater in both instances. CH clearly facilitated learning to a greater extent than ANP in most aspects. Though not significant, engagement with other visitors featured stronger for ANP, corroborating previous findings that visitors to the park were more focused on a leisure experience than learning and also with the geological features not contributing as much to the overall experience. CH also facilitated deep connections to a greater extent, accept in the case of 'nature' which makes sense when considering the stronger feature of biotic features at ANP. Two other individual aspects that differed significantly were 'rarity' with content at CH regarded scarcer; while 'information through maps, brochures and signage' were regarded as better at ANP. Overall, these two attractions provided visitors with similar contributions of desirable content and effective visitor management. These two ratings indicate both sites' potential to facilitate MTEs through the desired format of content (Ham, 2016), as well as effective layout of facilities (after Newsome et al., 2012).

CONCLUSION

Findings of the study illustrate that experience of the geological features vary between attractions based on the site context and visitor type (corroborating Dowling & Newsome, 2018; Gordon, 2018; Grobbelaar et al., 2019; Hose, 2016). The scale identified similarities and differences across the sites, both in terms of complete factors (learning and fulfilment) as well as three individual aspects meaningfully explained against the characteristics of the attractions. The performance of the scales, in turn, matched the initial evaluations of the sites based on the importance and performance of the geological features. In the case of Augrabies Waterfall, visitors' 'top-of-mind' connotations with the park included the waterfall (abiotic feature) and fauna and flora (biotic features). The vast majority rated the performance of the waterfall as best, followed by two prominent rock formations (all being abiotic features).

In line with the performance scores, the rock formations and landscape featured stronger than cultural and biotic aspects (after Dowling & Newsome, 2018). The site could fall within the broader scope of geotourism for tourists that visit the park specifically for geotourism purposes (after Dowling & Newsome, 2018). For the visitor profile sampled, however, other experience dimensions such as refreshment may become more important for this attraction (after Kim et al., 2012). Connection with other visitors through shared experiences would also be important, especially for leisure visitors (after Chandralal & Valenzuela, 2013; Knobloch et al., 2014).

Aquino, Schänzel and Hyde (2018) highlighted the importance of these socio-cultural dimensions of geotourism experiences. Visitor engagement with geological

content may be incidental (Dowling & Newsome, 2018; Gordon, 2018; Grobbelaar et al., 2019; Hose, 2016), yet should be presented in a manner that simultaneously allows socialization. There may be an opportunity to engage these visitors with geological features through more 'landscape leisure' activities suitable to the environment (Serrano & Trueba, 2011). Aesthetics and visual value will be prominent aspects of visitors' experiences of the geological features (after Štrba, 2015). Visitors' 'top-of-mind' descriptors for CH included evolution / beginning of humankind, corroborating the findings of Stratford (2018) and indicating successful messaging of the main purpose of the attraction (after Larson, 2007). Similar to the rock formations at Augrabies, the caves received a very high performance score despite being one of the least mentioned aspects associated with the attraction. The 'sustainability' exhibition received the lowest score as well as not featuring in the 'top-of-mind' connotations, indicating an opportunity to place greater emphasis on geoconservation and sustainable resource use as key outcomes of geotourism (Dowling & Newsome, 2018).

In the case of CH, abiotic aspects featured strongest, making the site appropriate as a geological tourism site as opposed to a geotourism site in the wider sense (after Dowling & Newsome, 2018). Respondents had positive sentiments regarding the contribution of the aspects measured to an overall memorable experience, with the site successfully facilitating learning as major benefit sought at geosites (Dowling & Newsome, 2018; Hose, 2012). Again, the finding could be interpreted against the visitor profile sampled: domestic day visitors with a high level of education (postgraduate degree) and possibly seeking intellectual stimulation; as well as being first time visitors who are 'awed' when first exposed to the content. The proposed dimensions ('content', 'learning', 'visitor management', and 'fulfilment') were supported through an EFA converging into the four reliable factors. Factor one, content, presents the characteristics of the geological features and include perceived authenticity (corroborating Štrba, 2015); unusual / rarity / novelty (after Chandralal & Valenzuela, 2013; Kim et al., 2012; Knobloch et al., 2014; Štrba, 2015); variety / diversity (Gordon, 2018; Kruger et al., 2015); identification (Kruger et al., 2015) and proximity of viewing (Hose, 2002; Kruger et al., 2015). Factor 2, learning, relates strongly to the forms of interpretation through various mediums, with knowledgeable guides featuring strongly (corroborating Hose, 2012 and Gordon, 2018). Factor 3, visitor management, relates to site information, ease of viewing and movement; supporting Gordon's (2018) emphasis on well-planned and –designed interpretation that meets visitor needs. The last factor, fulfilment, relates to a deep connection (after Kang et al., 2008) with nature, history and mankind especially in the geotourism context (corroborating Gordon, 2018). It highlights the importance of the emotional value ("Objects related to famous persons or event of global / international / national significance") (seeŠtrba, 2015).

A limitation to the study is the relatively small sample size, along with the fact that it was cross sectional. This brings limitations to the generalizability of the findings to the broader visitor market. Point in case is that the visitors at ANP were predominantly locals who frequented the park for leisure purposes. Though the geological features formed a greater part of their experience that the fauna and flora, they would not necessarily attach the same value to interpretation services than those specifically coming to the park to view the geological features (waterfall and rock formations). Applying the survey across different tourism peak periods will ensure representation of tourist types. Relationships between tourist motivations and satisfaction with experiences can also be tested. The current four factors (experience dimensions) only accounted for 50% of the variance. Opportunities for further research include expansion of the scale to measure other key components of experiences including intangible aspects such as local culture (after Kim et al., 2012; Park & Santos, 2017; Tung & Ritchie, 2011). The latter may play a significant

component as culture (represented through people – past and present – from the region) forms part of the broader geotourism continuum (Gordon, 2018). Involvement is another dimension that can add value, given the relationship between co-creation and experiential value (Barnes et al., 2019). Comparing different geotourism contexts to explore variations in experiences can be meaningful. Lastly, quality of the geological features can be measured at the hand of criteria as done by Štrba (2015) as well as Dony et al. (2015).

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