

1 Specialization and importance-performance in visitors to a natural history museum, the Canadian
2 Fossil Discovery Centre, Morden, Manitoba, Canada

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8

9 ABSTRACT

10 The Canadian Fossil Discovery Centre (CFDC) in Morden, Manitoba, Canada, is home to the
11 largest collection of marine reptile fossils in North America. The CFDC houses thousands of
12 local finds from active dig sites across the Manitoba Escarpment. The Museum has experienced
13 average annual increases in visitation since 1994, is noted as a Manitoba Star attraction, and was
14 rated in the top 5 travel destinations in Manitoba in *Maclean's*. Due to the limited space of the
15 Museum, the staff and volunteers display 21 exhibits to its visitors, with hopes of expansion to a
16 larger facility. This study reports on a survey of visitors to the CFDC in the summer of 2012
17 (n=137). The purpose of the study is to classify visitors using the recreation specialization
18 paradigm (in this case past experiences and exposure to paleontology and ancient marine
19 reptiles), as well as assess expectations and satisfaction, as tools for future expansion planning.
20 This is the first application of the specialization approach to museum visitors. Visitors were
21 characterized by a low degree of specialization in the subject area, indicating a basic education
22 program is required. Participants reported high levels of satisfaction with respect to important
23 reported expectations. However, open-ended comments indicated that some participants did not
24 fully understand the material presented in CDFC interpretive displays, which corroborates the
25 specialization finding. The results illustrate a successful application of the specialization
26 approach to museum tourists, which may help to improve interpretive message design.

27 Keywords: specialization, importance-satisfaction, Canadian Fossil Discovery Centre

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32 INTRODUCTION

33 Heritage is as a growing international market segment in the tourism industry (e.g. Kim,
34 Cheung, & O’Leary, 2007; Post, 2013). Canada represents an example of this growth (Shipley,
35 Utz & Parsons, 2006). Canadians, for example, have shown an increased interest in museum
36 visitation, and therefore education tourism. The most recent aggregate data on museum visitation
37 in Canada indicate a 7% annual increase between 1993 and 2003, attracting 58,759,000 visitors
38 in 2002-03. The demand for museum experiences is also illustrated in a 16% increase in new
39 institution establishment over the same time period (Statistics Canada, 2012). This trend echoes
40 an increase in global education tourism (Tarrant, Stoner, Borrie, Kyle, Moore, & Moore, 2011).
41 At the same time, the literature has been expressing the importance of improving destination
42 management and marketing (Kim, Ritchie, & McCormick, 2012; Klimek, 2013). Cox & Wray
43 (2011), for example, examined best practice marketing for 21 regional tourism destinations in
44 Australia. They concluded that destination stakeholders (e.g. museum executives) need to better
45 develop effective visitor information services, which they argue can be achieved through
46 cooperative approaches, such as the project described in this paper. In addition, Ramkissoon,
47 Uysal, & Brown (2011) encourage a better understanding of cultural attraction consumers, which
48 the subject examined here.

49 This paper reports on a survey of visitors to the Canadian Fossil Discovery Centre, in
50 Morden, Manitoba (+49.196551, -98.094655), in the summer of 2012 (n=137). We employed
51 the recreation specialization paradigm (Bryan, 1977) to examine whether visitors to the CFDC
52 could be classified into sub-groups based on past experiences and exposure to paleontology and
53 ancient marine reptiles, and the importance-performance model (Martilla & James 1977) to
54 gauge visitors’ expectations and satisfaction of their experience at the CDFC, as tools for future

55 expansion planning. We also collected-open-ended comments regarding participants' visit to the
56 CDFC. The results illustrate a successful application of the specialization approach to natural
57 history museum tourists, which may help to improve interpretive message design. The study also
58 provides a reference for future research into museum and tourism development in rural areas.

59

60 LITERATURE REVIEW

61 Rural regions throughout the western world continue to struggle as traditional economies
62 (e.g. fishing, agriculture, mining, forestry) fall into decline (MacDonald & Joliffe, 2003; Mahony
63 & Van Zyl, 2002). The Canadian prairies are no different in this regard (Epp & Whitson, 2001;
64 Fullerton, 2010; Ramsey & Everitt, 2007). Heritage tourism, including museums, has long been
65 recognized as having an economic impact (Johnson & Thomas, 1992). Rural tourism is often
66 seen as either a supplement or panacea as communities look for new economic development
67 opportunities (Craveiro, Kias-Sardinha, & Milheiras, 2013; Fullerton, 2010; McDonald &
68 Joliffe, 2003; Sullivan & Mitchell, 2012), including tourism activities which promote the past
69 (Post, 2013). Blichfeldt & Halkier (2013), for example, promote place branding for tourism
70 development within a larger community development approach. Such thinking is consistent with
71 other scholars who have taken a regional or even route-based approach to place branding through
72 regional, theme-based marketing (Graham and Murray, 2003; Ramsey and Everitt, 2007;
73 Timothy & Boyd, 1999). The research conducted in Morden is illustrative of this as the
74 archaeological research is regionally-based with the CDFC marketing the museum as the display
75 place for the regional richness in fossil discoveries. The regional marketing strategy of the CFDC
76 is evidenced in its marketing of other recreational and tourism opportunities, including golf,

77 heritage, festivals and tourism services (e.g. accommodation), links of which for example are
78 directly available from the CFDC main Web site (e.g. <http://www.discoverfossils.com/>).

79 Preserving heritage and the environment in rural regions, including integrated approaches
80 to sustainable rural tourism development have been advocated for almost two decades
81 (Aronsson, 1994; Bramwell & Lane, 1993; Barcus, 2013; Kim & Lee, 2013). One element to
82 sustainability is authenticity (Daugstad & Kirchengast, 2013; Kidd, 2011; McIntosh & Prentice,
83 1999; Kneafsey, 2001). Kidd (2011) argues that museum displays and public performances are
84 important tools for analyzing the relationship between authenticity and heritage. In a similar
85 way, Frisvoll (2013) conceptualizes authentication such that museums are representations of
86 rural heritage. Others have noted the dangers in the commodification of heritage and history (e.g.
87 Bardone, Rattus & Jaats, 2013; Blundell, 1993; Laxson, 1991; Swanson, 2013; Zeppel, 2006).
88 Concerned about achieving a balance between ensuring authenticity while not commodifying the
89 science and history of the region, this research employed surveys at the CDFC to gauge visitor
90 perceptions of what they experienced.

91 Attracting visitors to rural and remote areas can be a challenge (Post, 2013; Prideau &
92 Kininmount, 1999; Xiao, 2013). Understanding tourist motivations (Devesa, Laguna & Palacios,
93 2010; Park & Yoon, 2009) and implementing appropriate destination marketing and management
94 (Royo-Vela, 2009; Xiao, 2013) are central issues to be addressed. Devesa, Laguna & Palacios
95 (2010), for example document the role of motivations of rural tourists through visitor
96 satisfaction. Using a model of four types of motivation (tranquility, culture, proximity, return
97 visit), they found that visitor evaluations of experience is affected by motivations for seeking out

98 that experience. In contrast, Royo-Vela (2009) assessed destination image management by
99 conceptualizing culturally-based rural experiences and applying it to locations in Girona, Spain.

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101 *Natural History Museums and the Canadian Fossil Discovery Centre*

102 Dinosaur and ancient reptile fossils have a great power to educate about natural history,
103 and have become increasingly popular over the past few decades (Stemmler, 2006). The world
104 famous Royal Tyrrell Museum, in Drumheller, Alberta, for example, received its 10 millionth
105 visitor in 2010-2011, during only its 25th year of operation (Royal Tyrrell Museum Cooperating
106 Society 2011). Dinosaur fossils have particularly been utilized to inspire curiosity in the natural
107 world with children (Stemmler, 2006). The Canadian Fossil Discovery Centre houses the largest
108 collection of marine vertebrate fossils in Canada, all collected in Manitoba, including ‘Bruce’, a
109 13-metre mosasaur (*Hainosaurus peminensis*), the largest specimen of this species ever
110 discovered. The marine reptile exhibits at the Royal Tyrrell Museum are from the CFDC’s
111 collection (Janzic, pers. com.). The CFDC is becoming increasingly popular as a tourism
112 destination. The institution recorded increased visitation each year from 2004-2010, representing
113 a 9% annual growth rate. Approximately 12,000 people now visit the CFDC per year (CDFC,
114 2011). In 2009, Maclean’s Magazine listed the CFDC as a Top 5 Manitoba tourist destination
115 (Banks, 2009). Tourism Manitoba has designated the Centre as a “Star Attraction” and a Top 20
116 visit for the province (Travel Manitoba, 2012).

117 In addition to its fossil exhibition, the CFDC runs an active research program, employing a
118 full time executive and assistant curator. The fossil collection continues to grow every year and

119 CFDC paleontologists have made major fossil discoveries in Manitoba in three of the past five
120 years. The most recent, a *Xiphactinus* fish fossil in 2010, was covered by 45 media outlets across
121 Canada and the United States, as well receiving international coverage, illustrating both the
122 public interest in palaeontology and the important scientific research role played by the CFDC.
123 As part of its research program the Centre offers participatory fossil dig programs for the general
124 public and schools. Participation in these programs has also recently increased (CFDC, 2011).

125 Due to its consistently increasing visitation, fossil collection, and research program, the
126 CFDC has aspirations to build a new museum near Morden and a field station at its main
127 research site on the Manitoba Escarpment, near Miami (Janjic, pers. com.). In 2008, as part of
128 its future planning, the Centre undertook a Community Input Study. The study used community
129 group meetings, focus groups, and online surveys to assess the desires and opinions of south-
130 central and south-eastern Manitoba communities regarding the Centre's current exhibition and
131 programs, as well as a proposed expansion. The study concluded that there was significant
132 regional support to pursue the expansion goals, and received 30 letters of support from various
133 sources such as MLA's, town and city councils, and school divisions (CFDC, 2009; 2011).
134 While the 2008 CFDC study addressed regional attitudes towards the current and possible future
135 museum, it did not collect data from visitors to the Centre. The purpose of this research, then, is
136 to gain an understanding of visitors to the Canadian Fossil Discovery Centre to help manage
137 current and develop future exhibits within the process of expansion.

138 Understanding the challenges faced by rural areas (Mahoney & Van Zyl, 2002; Xiao,
139 2013) and the need for appropriate place branding (Blitchfelt & Halkier, 2013) and marketing
140 (Prideau & Kininmount (1999), the survey research reported on in this paper sought to provide a

141 picture of visitor characteristics, satisfaction, and perceptions of the products associated with the
142 Canadian Fossil Discovery Centre in Morden, Manitoba. In doing so the educational and
143 experiential background of visitors, including as it related to fossil knowledge, was ascertained.

144

145 METHODS

146 A survey methodology utilizing an intercept technique (Sheskin, 1985) was employed for
147 this research. To improve response rates and ensure quality control in the data collection, the
148 survey was administered by a research assistant. The same research assistant conducted all
149 interviews using the same prompts if necessary to clarify questions respondents may have had.
150 As Rea and Parker (1992) note, by administering a questionnaire directly to the respondent, the
151 researcher is in a better position to acknowledge a respondents' understanding of statements and
152 questions. According to Czaja & Blair (1996), while costing more and taking more time, of the
153 various methods to employ surveys (e.g. mail, telephone), face-to-face interviews yield the
154 highest response rates and also result in lower sampling frame and response biases. This survey
155 findings reported on in this paper builds on the visitor perception survey-based research
156 conducted elsewhere (e.g. Carmichael, 2005; Priskin, 2004; Ramsey & Everitt, 2008).

157 The questionnaire was developed to collect Canadian Fossil Discovery Centre visitor data
158 in five sections: 1) previous experiences with respect to palaeontological education, museum
159 visits, and dig site visits, 2) importance of various experience at the CFDC, 3) demographics, 4)
160 satisfaction with respect to the items in section 2, and 5) four open-ended questions regarding
161 positive and negative aspects of the experience. The instrument included both closed and open-

162 ended questions and statements, including Likert-type scales that provide for the identification of
163 perception ranges (Jackson, 1999; Walsh & Ramsey, 2003). The questionnaires were
164 administered to CFDC visitors on Fridays, between June 1 and August 31, 2012. Sections 1 to 3
165 were completed upon arrival at the CFDC and sections 4 and 5 as the participants prepared to
166 leave. A total of 137 surveys were collected. The refusal rate was 19%. The participation rate
167 was 81% which is high based on the literature which indicates that a response rate of 60% is
168 considered representative (Dolsen & Machlis 1991) and above 70% very good (Babbie 2007).

169 *Specialization Analysis*

170 Data to create a specialization index were collected in Section 1 of the questionnaire. The
171 recreation specialization paradigm posits that participants engaged in a leisure activity are not a
172 homogeneous group and that sub-groups may require distinct management techniques (Bryan
173 1977). A specialization metric places participants on a scale from novice (low) to experienced
174 (high) (Duffus & Dearden 1990), based on variables such as prior experience, levels of education
175 and interest, time and economic commitments, travel patterns, and centrality to the participants'
176 lifestyles . Kerstetter, Confer, & Graefe (2001) demonstrated that specialization could be applied
177 to heritage site tourists in Pennsylvania, United States. We hypothesize that CFDC visitors will
178 also be composed of sub-groups that require different education approaches. In addition, degree
179 of participant specialization has been shown to influence perceptions, expectations, and
180 satisfaction of tourists (Dearden, Bennett, & Rollins, 2007; Malcolm & Duffus, 2007, Rollins &
181 Connolly, 2002). Methods of creating specialization indexes vary, using techniques such as z-
182 scores, cluster analysis, factor analysis, or summed scoring (Dearden, Bennett, & Rollins, 2007;
183 Ditton, Loomis, & Choi, 1992; Donnelly, Vaske, & Graefe, 1986; Malcolm & Duffus, 2007,

184 McFarlane, 1994, Schreyer, Lime, & Williams, 1984; Watson, Roggenbuck, & Williams, 1991).
 185 Most indexes are composed of a maximum of four groups.

186 A reliability score on the index questions indicated an alpha coefficient of .580; however,
 187 with Question 2 ('Priority of visit to the CFDC') removed, the alpha coefficient increased to .620
 188 (Table 1). Question 2 was therefore removed prior to classification of respondents into
 189 specialization groups and further analyses. We converted item responses for each case into z-
 190 scores to standardize for scale differences between Questions 1a-d and Question 3 then used
 191 mean z-scores for the five items as a measure of specialization. The mean z-scores were then
 192 classified into 'low', 'intermediate-low', 'intermediate-high' and 'high' specialization groups.
 193 Cut-points to distinguish group membership were made by dividing the range of specialization
 194 scores into quarters.

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 196 Table 1: Palaeontology specialization index items and reliability coefficients.
 197

Specialization index question	Alpha coefficient if deleted
1. Before today, how many times have you:	
a. Visited a palaeontology museum	0.376
b. Visited a nature museum	0.511
c. Visited the CFDC	0.571
d. Participated in a fossil dig	0.553
2. Priority of visit to the CFDC ¹	0.620
3. Previous learning about dinosaurs and ancient reptiles (books, magazines, internet, educational videos, television, other museums, other)	0.496

198 ¹ This item was not used in specialization index calculation or further analysis
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204 *Importance-Satisfaction Analysis*

205 While satisfaction measures in service industries are common, museum visitor satisfaction
206 studies are rare (Hume, 2011). In this paper we examine satisfaction using the importance-
207 performance (IP) model, first introduced in service industries by Martilla & James (1977). IP
208 compares the degree of importance for particular elements of a service to satisfaction following
209 delivery of the service. The model has recently been applied to tourism studies for heritage and
210 cultural destinations (Donohue, 2011; Ramkissoon et al. 2011) and wildlife ecotourism (Coghlan
211 2012, Malcolm, 2009, Ziegler, Dearden, & Rollins, 2012), where it is often referred to as
212 importance-satisfaction.

213 Linked importance-satisfaction items are listed in Table 2. Mean, standard deviation, gap
214 analysis (mean importance minus mean satisfaction), and Wilcoxin t-tests were calculated for
215 each importance performance item. In addition a scatter plot of satisfaction versus importance
216 means was created to provide a graphical comparison of the importance-satisfaction scores.
217 There are two main types of analysis for this method. The original approach (Martilla & James
218 1977) is to add crosshairs to divide the scatter plot into four sectors, representing ‘keep up the
219 good work’ (high importance and high satisfaction), ‘concentrate here’ (importance >
220 satisfaction), ‘low priority’ (low importance and low satisfaction), and ‘possible overkill’
221 (satisfaction >> importance). However, methods of where to place the crosshairs are subjective

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224 Table 2: Expectation-satisfaction items and Likert-scale answer options for each item

Item	Expectation Scale	Satisfaction Scale
1 See ancient reptile fossils/skeletons	1 Not at all	1 Not at all
2 Learn about ancient marine reptiles	important	satisfied
3 Take a guided tour of the museum	2 Slightly	2 Somewhat
4 See Bruce, the mosasaur	important	satisfied
5 Learn about Manitoba’s ancient ecosystems	3 Important	3 Satisfied
6 Learn the difference between dinosaurs and ancient reptiles	4 Essential	4 Very satisfied
7 Learn about the history of marine reptile/fish fossils in Manitoba		
8 Other		

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227 (Ziegler, 2012) and variable in the literature (e.g. Coughlan, 2012; Malcolm, 2009; Oh, 2001;
 228 Randall & Rollins, 2009; Rollins & Rouse, 1993). A less subjective method is the placement of
 229 an iso-line at 45° from the origin of the scatter plot (e.g. Hawes & Rao, 1985; Slack, 1994;
 230 Abalo, Varela, & Manzano, 2007; Ziegler, 2012). The iso-line represents points where
 231 importance and satisfaction are equal; items above the line have lower satisfaction scores and
 232 represent areas where alternative or improved management is needed. Increased distance from
 233 the iso-line indicates increased discrepancy between importance and satisfaction. We employed
 234 the iso-line method. Mann-Whitney U-tests were performed between specialization types for
 235 each importance-satisfaction item.

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238 RESULTS

239 The majority of visitors to the CFDC were families with children (60.5%) who were
240 living in Manitoba (84.1%). Slightly more females (56.6%) than males filled out the survey.
241 Respondents were a variety of ages; 30-39 (31%), 50-59 (24.8%), and 20-29 (18.6%) were the
242 three largest groups. With respect to highest level of education completed, 31.8% percent of
243 respondents possessed an undergraduate university degree, followed by college diploma
244 (17.1%), high school (14.7%), and a post-graduate degree (14%). The majority of participants
245 (70.7%) were visiting the CFDC for the first time.

246 The response percentages and mean score for each item used to create the specialization
247 index are given in Table 3. The majority of respondents were classified as 'low' (30.9%) and
248 'intermediate-low' (53.3%), comprising 84.6% of the sample. Only 15.4% of the sample was
249 classified in the two more highly specialized categories, 'intermediate-high' (13.2%) and 'high'
250 (2.2%). Only three respondents were classified as 'high', therefore importance-satisfaction
251 comparisons between specialization groups were restricted to 'low', 'intermediate-low', and
252 'intermediate-high'. Mann-Whitney U-tests indicate that there was no statistical difference
253 between specialization groups for 'Highest level of education completed' ('low' vs.
254 'intermediate-low': $U=1,326$, $p=0.801$; 'low' vs. 'intermediate-high': $U=404$, $p=0.187$;
255 'intermediate-low' vs. 'intermediate-high': $U=747$, $p=0.095$). Table 4 compares the mean
256 response for each item used to calculate the specialization index by specialization group. The
257 results support the index calculation method. Mann-Whitney U-tests show that the differences
258 between each group for every item are statistically significant. Correlations between index item
259 and specialization scores range from moderate to strong and all are significant at $p=0.01$.

260 Table 3: Response results for specialization index items.

Item	Percent of sample	Mean score
1. Before today, how many times have you:		
a. Visited a palaeontology museum?		2.3
Never	27.8	
Once	29.3	
2 to 5 times	29.3	
6 to 10 times	9.0	
More than 10 times	4.5	
b. Visited a nature museum		3.4
Never	8.2	
Once	9.0	
2 to 5 times	38.1	
6 to 10 times	28.4	
More than 10 times	16.4	
c. Visited the CFDC?		1.4
Never	70.7	
Once	16.5	
2 to 5 times	12.0	
6 to 10 times	0.8	
More than 10 times	0.0	
d. Participated in a fossil dig?		1.2
Never	86.5	
Once	10.5	
2 to 5 times	1.5	
6 to 10 times	0.8	
More than 10 times	0.8	
3. Previous learning about dinosaurs and ancient reptiles (e.g. books, videos, internet, etc.):		2.9
0 items	5.1	
1 items	20.6	
2 items	21.3	
3 items	14.0	
4 items	15.4	
5 items	15.4	
6 items	6.6	
7 items	1.5	

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265 Table 4: Mean scores, Mann-Whitney U-tests, and correlations between specialization groups for items
 266 used to calculate the specialization index.

	Mean			Mann-Whitney p-value ¹	Spearman's rho (p-value)
	'low'	'inter-low'	'inter-high'		
Previously visited a palaeontology museum	1.46	2.41	3.67	l vs i-l: <0.000 l vs i-h: <0.000 i-l vs i-h: <0.000	0.658(<0.000)
Previously visited a nature museum	2.59	3.47	4.50	l vs i-l: <0.000 l vs i-h: <0.000 i-l vs i-h: <0.000	0.559 (<0.000)
Previously visited the CFDC	1.10	1.43	2.00	l vs i-l: 0.003 l vs i-h: <0.000 i-l vs i-h: 0.016	0.391 (<0.000)
Previously participated on a fossil dig	1.00	1.13	1.39	l vs i-l: 0.020 l vs i-h: <0.000 i-l vs i-h: 0.029	0.395 (<0.000)
Previous learning	1.55	3.26	4.72	l vs i-l: <0.000 l vs i-h: <0.000 i-l vs i-h: 0.001	0.582 (<0.000)

267 ¹ l='low', i-l='intermediate-low', and i-h='intermediate-high'

268

269 Results for the importance-satisfaction analysis are given in Table 5. The items ranked
 270 most important by respondents were 4: 'See Bruce, the mososaur' and 1: 'See ancient reptile
 271 fossils/skeletons'. The least important items were 3:'Take a guided tour of the museum' and
 272 6:'Learn the difference between dinosaurs and ancient reptiles'. The highest satisfaction ratings
 273 were also items 4 and 1, respectively, while the least satisfactory items were 6 and numbers 5:
 274 'Learn about Manitoba's ancient ecosystems' and 7:' Learn about the history of marine
 275 reptile/fish fossils in Manitoba (tied). In all cases the gap value is negative and the difference
 276 statistically significant, indicating higher satisfaction than importance.

277

278 Table 5: Means, gap analyses, and Wilcoxin t-test p-values for importance-satisfaction items

Item	Importance		Satisfaction		Gap value (I-S)	p
	mean	sd	mean	sd		
1 See ancient reptile fossils/skeletons	3.32	0.63	3.46	0.59	-0.14	0.045
2 Learn about ancient marine reptiles	2.98	0.62	3.33	0.61	-0.35	<0.000
3 Take a guided tour of the museum ¹	2.37 (2.11)	0.86	3.32	0.82	-0.95	<0.000
4 See Bruce, the mosasaur	3.09	0.87	3.76	0.43	-0.67	<0.000
5 Learn about Manitoba's ancient ecosystems	2.90	0.66	3.28	0.62	-0.38	<0.000
6 Learn the difference between dinosaurs and ancient reptiles	2.70	0.77	3.22	0.62	-0.52	<0.000
7 Learn about the history of marine reptile/fish fossils in Manitoba	2.82	0.76	3.28	0.64	-0.46	<0.000

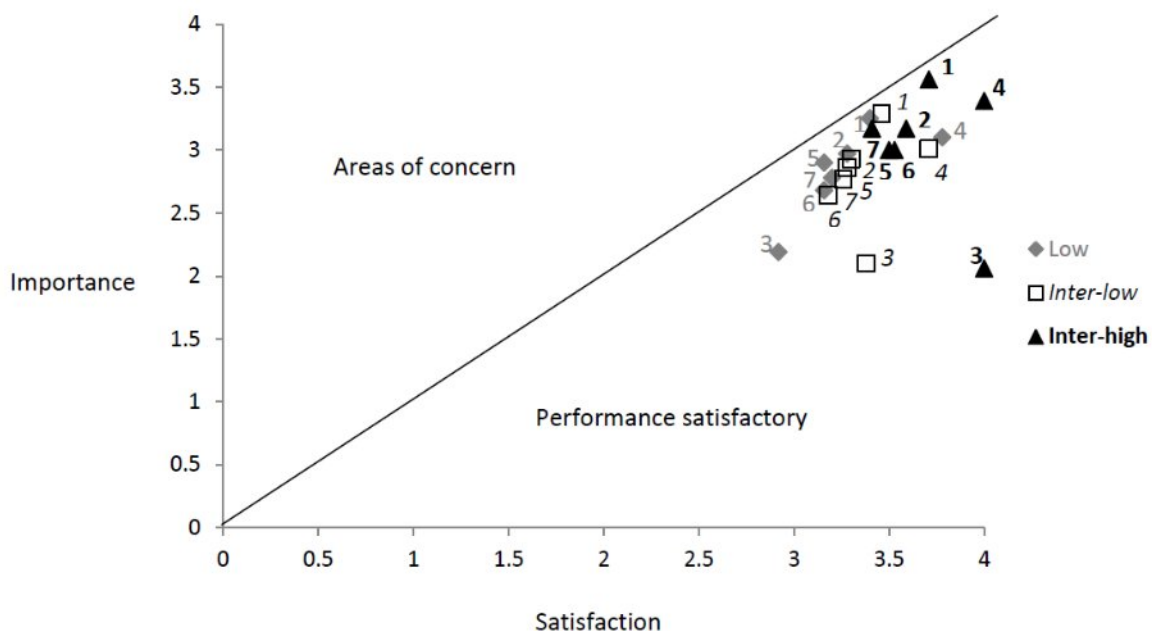
279 ¹ Only respondents that participated in a guided tour (n=42) filled out the importance and satisfaction
 280 portions of this item. Importance for the entire sample (n=137) is given in brackets.

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282 'Take a guided tour of the museum' was ranked as a comparatively low priority item by the
 283 entire sample (n=137, mean=2.11) but only those that participated on a guided tour answered the
 284 satisfaction portion of the item. For those that took a guided tour (n=42) the item was given
 285 more importance (mean=2.37) and satisfaction was high (mean=3.32). Participants that did not
 286 take a guided tour indicated the item was the least important (n=95, mean=1.9).

287 The scatter plot of importance versus satisfaction scores by specialization group (Figure 1)
 288 reveals that all items are below the iso-line, indicating that respondents were satisfied with every
 289 item. However, there are differences between specialization groups. In particular, 'intermediate-
 290 high' responses cluster higher. Statistically significant differences exist between specialization

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294 Figure 1: Scatter plot of importance versus satisfaction item scores for specialization groups

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297 Table 6: Statistically significant differences (Mann-Whitney U-test) in importance and satisfaction
 298 between specialization groups

		Importance-satisfaction item			
		Learn about ancient marine reptiles	Learn about ancient ecosystems in Manitoba	Learn the difference between dinosaurs and ancient reptiles	Learn about the history of marine reptile/fish fossils in Manitoba
Importance					i-l vs i-h (p=0.042)
Satisfaction	l vs i-h (p=0.032) i-l vs i-h (p=0.022)		l vs i-h (p=0.022)	l vs i-h (p=0.022) i-l vs i-h (p=0.039)	

299 **l**=‘low’, **i-l**=‘intermediate-low’, and **i-h**=‘intermediate-high’. **Bold** indicates which group reported greater
 300 importance or satisfaction.

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303 groups for four importance-satisfaction items (Table 6). In all cases the more specialized group
304 possessed the higher importance or satisfaction.

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306 Table 7 lists the four most common answers to the open-ended questions in section 5 of
307 the questionnaire. Themes in the comments include high satisfaction with ‘Bruce’ and the fossil
308 displays, a desire to expand/improve the facility, a need for more child-oriented experiences, and
309 conflicting comments regarding the educational material/experience included in the experience.

310

311 Table 7: Four most common answers to open-ended questions

Question (number of responses)	Most common comments (n)
What did you like the best? (121)	“seeing Bruce” (73) “well laid out information” (14) “variety of fossils” (6) “learning about ancient reptiles close to Morden” (6)
What did you dislike? (84)	“nothing” (31) “not long enough” / “museum too small” / “basement not a nice setting” / “hard to access” (19) “too much / info hard to understand” (16) “needs more information for children” (7)
What would you change? (94)	“make it easier to understand” e.g. interactive, video, audio (15) “nothing” (14) “more kid friendly” e.g. crafts, hands-on, craft table (14) “more fossils / exhibits” (11)
What would you keep the same? (85)	“most of it” / “everything” (35) “Bruce” (19) “displays” (15) “nice / knowledgeable staff” (6)

312

313 DISCUSSION

314 The Canadian Fossil Discovery Centre appears to be a regional, family-centric destination
315 that draws visitors to Morden as the primary or one of several reasons to visit the city. Currently,
316 the majority of visitors appear to be first-timers. A larger venue could perhaps increase its range
317 as a pull factor and provide the opportunity for rotating displays to attract repeat visitation. We
318 were able to establish that visitors to the CFDC were composed of specialized sub-groups. The
319 mean responses for each item used to construct the specialization index are significantly different
320 between each group (Table 4). Overall, the respondents can be generally characterized as
321 modestly specialized with respect to palaeontological experiences. Almost 85% of participants
322 were classified in the ‘low’ and ‘intermediate-low’ groups, with only a small percentage in the
323 ‘intermediate-high’ and ‘high’ groups. There is a correlation, particularly with respect to
324 previous visitation to palaeontology and nature museums, as well as previous number of learning
325 media consulted, between increased previous experiences related to palaeontology heritage
326 education and increased specialization. This correlation may provide the more highly specialized
327 respondents with a greater context upon which to interpret the material presented in the CFDC
328 displays.

329 Some of the comments from the open-ended section of the questionnaire likely reflect the
330 modest level of specialization observed in the respondents. We received sixteen comments under
331 “What did you dislike?” and fourteen under “What would you change?” (Table 7) that indicate
332 the information presented with the displays was difficult to understand for some visitors. All
333 respondents that made the comments above were classified as either ‘low’ or ‘intermediate-low’
334 in the specialization index. These results suggest, similar to the recommendations of Kerstetter,

335 Confer, & Graefe (2001) and Malcolm & Duffus (2007), that given the majority of visitors were
336 on the lower end of the specialization spectrum, particular attention should be paid by the
337 executive of the CFDC to this group during development of interpretive displays and programs.
338 In addition, the CFDC may want to explore which material may need more fundamental
339 explanation or clarity. Kerstetter, Confer, & Graefe (2001) suggest that tourists on the lower end
340 of the specialization spectrum for these types of activities may require a more interactive
341 experience, which is evident in suggestions made by visitors to the CDFC (Table 7).

342 The findings above do not detract from the fact that each specialization group was
343 satisfied with all of the expectation items presented in the questionnaire. Visitors were very
344 satisfied with their experience at the CFDC, regardless of specialization. For each item,
345 satisfaction is statistically higher than expectation (Table 5) and none of the items fall into the
346 “Areas of concern” zone above the iso-line in Figure 2. It is visually evident in Figure 2,
347 however, that the expectation-satisfaction responses generally cluster higher with increasing
348 specialization. This pattern is borne out by the results presented for three importance-satisfaction
349 items in Table 6. In each case the more specialized group reported higher importance or
350 satisfaction. This is consistent with Kerstetter, Confer, & Graefe (2001) but generally
351 inconsistent with much of the specialization literature, which seems to follow the theory put forth
352 by Duffus & Dearden (1990) that increased proportions of less specialized tourists can cause
353 dissatisfaction in, and displacement of, more specialized participants. It is worth noting here that,
354 like Kerstetter, Confer, & Graefe (2001), the research presented in this paper addresses
355 specialization related to education-related tourism rather than recreational activity-related
356 tourism (e.g. birding, scuba-diving, skiing, and whale-watching) to which other specialization

357 literature refers. Caution should likely be taken in making direct comparisons between these two
358 types of activities prior to further research into this area.

359 The items in Table 6 for which greater statistical expectation or satisfaction were found in
360 more specialized visitors to the CFDC are all “learning” items. For the “viewing” items (‘See
361 ancient reptile fossils/skeletons’ and ‘See Bruce, the mososaur’), there are no statistical
362 differences in expectation or satisfaction between specialization groups. This finding may be
363 explained by the suggestion of Jackson & Norton (1980) and Kerstetter, Confer, & Graefe (2001)
364 that more highly specialized tourists are more interested in the “overall” experience. In this case,
365 we propose that inclusion of the more detailed learning items results in a more complete
366 experience, and higher satisfaction in particular, for more specialized visitors than just the main
367 highlights of viewing ‘Bruce’ and the other fossils on display. Further, although small in
368 number, two comments were received in the open-ended section of the questionnaire indicating a
369 desire to *increase* the amount of information provided. The comments were both made visitors
370 classified as ‘high’ in the specialization index. These results indicate that, although the CFDC
371 appears to receive a much lower proportion of more highly-specialized visitors, the Centre
372 should maintain and continue to develop in-depth interpretation.

373 While participants in this survey show high satisfaction with their experience at the CFDC,
374 some of the comments in the open-ended portion of the questionnaire (Table 7) expressed
375 concern about the limitations of the CFDC imposed by the small size of the museum and its
376 location in the basement of a community centre. The relative lack of child-oriented displays and
377 activities reflected in respondents’ comments is also related to these restrictions. These concerns
378 were also borne out in discussions with museum staff when the project was originally conceived.

379 Although these comments are negative in and of themselves, they serve to indicate visitor desire,
380 and couple nicely with local community and political support, for the development of an
381 expanded facility for the Canadian Fossil Discovery Centre.

382 As a final note, the CFDC provides an important example for heritage preservation and
383 tourism in rural areas. The Town of Morden, along with the south-central region of Manitoba,
384 has witnessed diversified economic growth and population increases over the past decade. The
385 CFDC can be seen as a regional museum as the archaeological digs occur in the countryside. The
386 CFDC has the potential to improve Morden's place as a service hub, including tourism, in this
387 region of Manitoba. Understanding market interest and ensuring authenticity will be paramount
388 to its future. Other rural regions could use the CFDC and the research reported on in this paper as
389 a starting point for understanding their products and markets.

390
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