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SPECIALIZATION AND IMPORTANCE-PERFORMANCE IN VISITORS TO A NATURAL HISTORY MUSEUM:

THE CANADIAN FOSSIL DISCOVERY CENTRE

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

RESUMEN: El "Canadian Fossil Discovery Centre" (CFDC) en Morden, Manitoba, Canadá, tiene la mayor colección de fósiles de réptiles marinos en América del Norte. El CFDC alberga miles de hallazgos provenientes de excavaciones activas en toda la zona de barrancos de Manitoba. Desde 1994 que el Museo ha asistido a un aumento de la media anual de visitantes, siendo considerado una atracción de la región y ha sido incluido en el top 5 de los destinos de viaje en el área de Manitoba por la revista Maclean's. Debido a las dimensiones reducidas del Museo, los funcionarios y voluntarios presentan 21 ejemplares de exposición a sus visitantes, con esperanza de expansión para un local más grande. Este estudio informa sobre una encuesta realizada a los visitantes del CFDC en el verano de 2012 (n=137). El objetivo de este

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estudio es la clasificación de los visitantes utilizando el paradigma de la especialización de las actividades recreativas (en este caso, experiencias pasadas y exposición a réptiles marinos antiguos), así como la evaluación de las expectativas y la satisfacción como herramientas para el futuro diseño de la expansión del Museo. Esta es la primera aplicación entre visitantes de museos del enfoque de la especialización. Los visitantes se caracterizaron por un bajo grado de especialización en el área, lo que parece apuntar para la necesidad de creación de un programa educativo básico. Los participantes reportaron altos niveles de satisfacción en relación a las expectativas importantes que fueron reportadas. Sin embargo, comentarios abiertos indicaron que algunos participantes no han comprendido completamente el material presentado en las exposiciones interpretativas, lo que corrobora la constatación de especialización. Los resultados ilustran una aplicación bien lograda del enfoque de especialización para los turistas del Museo, lo que puede ayudar a mejorar el design de los mensajes interpretativos. **Palabras-clave**: especialización, importancia -satisfacción, Canadian Fossil Discovery Centre.

RESUMO: O "Canadian Fossil Discovery Centre" (CFDC) em Morden, Manitoba, Canadá, acolhe a maior coleção de fósseis de répteis marinhos na América do Norte. O CFDC abriga milhares de descobertas provenientes de escavações ativas em toda a zona de desfiladeiros de Manitoba. Desde 1994 o Museu tem vindo a assistir a um aumento da média anual de visitantes, sendo considerado uma atração da região e tendo sido incluído no top 5 dos destinos de viagem na área de Manitoba pela revista Maclean's. Devido às dimensões reduzidas do Museu, os funcionários e voluntários apresentam 21 exemplares de exposição aos seus visitantes, com esperança de expansão para um local maior. O presente estudo é baseado num inquérito aos visitantes do CFDC no verão de 2012 (n=137). O objectivo deste estudo é a classificação dos visitantes utilizando o paradigma da especialização das atividades recreativas (neste caso, experiências passadas e exposição a répteis marinhos antigos), bem como a avaliação das expetativas e satisfação como ferramentas para o futuro planeamento da expansão do Museu. Esta é a primeira aplicação entre visitantes de museus da abordagem de especialização. Os visitantes caracterizaram-se por um baixo grau de especialização na área, o que parece apontar para a necessidade de criação de um programa educativo básico. Os participantes relataram altos níveis de satisfação em relação às expetativas importantes que foram relatadas. No entanto, comentários abertos indicaram que alguns participantes não entenderam completamente o material apresentado nas exposições interpretativas, o que corrobora a constatação da importância da especialização. Os resultados ilustram uma aplicação bem sucedida da abordagem de especialização para os turistas do Museu, o que pode ajudar a melhorar o design das mensagens interpretativas. **Palavras-chave:** especialização, importância-satisfação, Canadian Fossil Discovery Centre.

INTRODUCTION

Heritage is as a growing international market segment in the tourism industry (e.g. Kim, Cheung, & O'Leary, 2007; Post, 2013). Canada represents an example of this growth (Shipley, Utz & Parsons, 2006). Canadians, for example, have shown an increased interest in museum visitation, and therefore education tourism. The most recent aggregate data on museum visitation in Canada indicate a 7% annual increase between 1993 and 2003, attracting 58,759,000 visitors in 2002-03. The demand for museum experiences is also illustrated in a 16% increase in new institution establishment over the same time period (Statistics Canada, 2012). This trend echoes an increase in global education tourism (Tar-

rant, Stoner, Borrie, Kyle, Moore, & Moore, 2011). At the same time, the literature has been expressing the importance of improving destination management and marketing (Kim, Ritchie, & McCormick, 2012; Klimek, 2013). Cox & Wray (2011), for example, examined best practice marketing for 21 regional tourism destinations in Australia. They concluded that destination stakeholders (e.g. museum executives) need to better develop effective visitor information services, which they argue can be achieved through cooperative approaches, such as the project described in this paper. In addition, Ramkissoon, Uysal, & Brown (2011) encourage a better understanding of cultural attraction consumers, which is the subject examined here.

This paper reports on a survey of visitors to the Canadian Fossil Discovery Centre, in Morden, Manitoba (+49.196551, -98.094655), in the summer of 2012 (n=137). We employed the recreation specialization paradigm (Bryan, 1977) to examine whether visitors to the CFDC could be classified into sub-groups based on past experiences and exposure to palaeontology and ancient marine reptiles, and the importance-performance model (Martilla & James,1977) to gauge visitors' expectations and satisfaction of their experience at the CDFC, as tools for future expansion planning. We also collected open-ended comments regarding participants' visits to the CDFC. The results illustrate a successful application of the specialization approach to natural history museum tourists, which may help to improve interpretive message design. The study also provides a reference for future research into museum and tourism development in rural areas.

LITERATURE REVIEW

Rural regions throughout the Western world continue to struggle as traditional economies (e.g. fishing, agriculture, mining, forestry) fall into decline (MacDonald & Joliffe, 2003; Mahony & Van Zyl, 2002). The Canadian prairies are no different in this regard (Epp & Whitson, 2001; Fullerton, 2010; Ramsey & Everitt,

2007). Heritage tourism, including museums, has long been recognized as having an economic impact (Johnson & Thomas, 1992). Rural tourism is often seen as either a supplement or panacea as communities look for new economic development opportunities (Craveiro, Kias-Sardinha, & Milheiras, 2013; Fullerton, 2010; McDonald & Joliffe, 2003; Sullivan & Mitchell, 2012), including tourism activities which promote the past (Post, 2013). Blitchfelt & Halkier (2013), for example, promote place branding for tourism development within a larger community development approach. Such thinking is consistent with other scholars who have taken a regional or even route-based approach to place branding through regional, theme-based marketing (Graham and Murray, 2003; Ramsey and Everitt, 2007; Timothy & Boyd, 1999). The research conducted in Morden is illustrative of this as the archaeological research is regionally-based with the CDFC marketing the museum as the display place for the regional richness in fossil discoveries. The regional marketing strategy of the CFDC is evidenced in its marketing of other recreational and tourism opportunities, including golf, heritage, festivals and tourism services (e.g. accommodation), links of which, for example , are directly available from the CFDC main website (e.g. http://www.discoverfossils.com/).

Preserving heritage and the environment in rural regions, including integrated approaches to sustainable rural tourism development have been advocated for almost two decades (Aronsson, 1994; Bramwell & Lane, 1993; Barcus, 2013; Kim & Lee, 2013). One element to sustainability is authenticity (Daugstad & Kirchengast, 2013; Kidd, 2011; McIntosh & Prentice, 1999; Kneafsey, 2001). Kidd (2011) argues that museum displays and public performances are important tools for analyzing the relationship between authenticity and heritage. In a similar way, Frisvoll (2013) conceptualizes authentication such that museums are representations of rural heritage. Others have noted the dangers in the commodification of heritage and history (e.g. Bardone, Rattus & Jaats, 2013; Blundell, 1993; Laxson, 1991; Swanson, 2013; Zeppel,

2006). Concerned about achieving a balance between ensuring authenticity while not commodifying the science and history of the region, this research employed surveys at the CDFC to gauge visitor perceptions of what they experienced.

Attracting visitors to rural and remote areas can be a challenge (Post, 2013; Prideau & Kininmount, 1999; Xiao, 2013). Understanding tourist motivations (Devesa, Laguna & Palacios, 2010; Park & Yoon, 2009) and implementing appropriate destination marketing and management (Royo-Vela, 2009; Xiao, 2013) are central issues to be addressed. Devesa, Laguna & Palacios (2010), for example, document the role of motivations of rural tourists through visitor satisfaction. Using a model of four types of motivation (tranquility, culture, proximity, return visit), they found that visitor evaluations of experience is affected by motivations for seeking out that experience. In contrast, Royo-Vela (2009) assessed destination image management by conceptualizing culturally-based rural experiences and applying it to locations in Girona, Spain.

Natural History Museums and the Canadian Fossil Discovery Centre

Dinosaur and ancient reptile fossils have a great power to educate about natural history, and have become increasingly popular over the past few decades (Stemmler, 2006). The world famous Royal Tyrrell Museum, in Drumheller, Alberta, for example, received its 10 millionth visitor in 2010-2011, during only its 25th year of operation (Royal Tyrrell Museum Cooperating Society 2011). Dinosaur fossils have particularly been utilized to inspire curiosity in the natural world with children (Stemmler, 2006). The Canadian Fossil Discovery Centre houses the largest collection of marine vertebrate fossils in Canada, all collected in Manitoba, including 'Bruce', a 13-metre mosasaur (*Hainosaurus pembinensis*), the largest specimen of this species ever discovered. The marine reptile exhibits at the Royal Tyrrell Museum are from the CFDC's collection (Janzic, pers. com.). The CFDC is becoming increasingly popular as a tourism destination. The institution recorded increased visitation each year from 2004-2010, represen-

ting a 9% annual growth rate. Approximately 12,000 people now visit the CFDC per year (CDFC, 2011). In 2009, Maclean's Magazine listed the CFDC as a Top 5 Manitoba tourist destination (Banks, 2009). Tourism Manitoba has designated the Centre as a "Star Attraction" and a Top 20 visit for the province (Travel Manitoba, 2012).

In addition to its fossil exhibition, the CFDC runs an active research program, employing a full-time executive and assistant curator. The fossil collection continues to grow every year and CFDC paleontologists have made major fossil discoveries in Manitoba in three of the past five years. The most recent, a *Xiphactinus* fish fossil discovered in 2010, was covered by 45 media outlets across Canada and the United States, as well receiving international coverage, illustrating both the public interest in palaeontology and the important scientific research role played by the CFDC. As part of its research program, the Centre offers participatory fossil dig programs for the general public and schools. Participation in these programs has also recently increased (CFDC, 2011).

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

Fossil Discovery Centre to help manage current and develop future exhibits within the process of expansion.

Understanding the challenges faced by rural areas (Mahoney & Van Zyl, 2002; Xiao, 2013) and the need for appropriate place branding (Blitchfelt & Halkier, 2013) and marketing (Prideau & Kininmount, 1999, the survey research reported on in this paper sought to provide a picture of visitor characteristics, satisfaction, and perceptions of the products associated with the Canadian Fossil Discovery Centre in Morden, Manitoba. In doing so, the educational and experiential background of visitors, including as it related to fossil knowledge, was ascertained.

METHODS

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

The questionnaire was developed to collect Canadian Fossil Discovery Centre visitor data in five sections: 1) previous experiences with respect to paleontological education, museum visits, and dig site visits, 2) importance of various experience at the CFDC, 3) demographics, 4) satisfaction with respect to the

items in section 2, and 5) four open-ended questions regarding positive and negative aspects of the experience. The instrument included both closed and open-ended questions and statements, including Likert-type scales that provide for the identification of perception ranges (Jackson, 1999; Walsh & Ramsey, 2003). The questionnaires were administered to CFDC visitors on Fridays, between June 1 and August 31, 2012. Sections 1 to 3 were completed upon arrival at the CFDC and sections 4 and 5 as the participants prepared to leave. A total of 137 surveys were collected. The refusal rate was 19%. The participation rate was 81% which is high based on the literature which indicates that a response rate of 60% is considered representative (Dolsen & Machlis, 1991) and above 70% very good (Babbie, 2007).

Specialization Analysis

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

Vaske, & Graefe, 1986; Malcolm & Duffus, 2007; McFarlane, 1994; Schreyer, Lime, & Williams, 1984; Watson, Roggenbuck, & Williams, 1991). Most indexes are composed of a maximum of four groups.

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

Table 1: Palaeontology specialization index items and reliability coefficients.

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

[1] This item was not used in specialization index calculation or further analysis

Importance-Satisfaction Analysis

While satisfaction measures in service industries are common, museum visitor satisfaction studies are rare (Hume, 2011). In this paper we examine satisfaction using the importance-performance (IP) model, first introduced in service industries by Martilla & Ja-

mes (1977). IP compares the degree of importance for particular elements of a service to satisfaction following delivery of the service. The model has recently been applied to tourism studies for heritage and cultural destinations (Donohue, 2011; Ramkissoon et al, 2011) and wildlife ecotourism (Coghlan 2012, Malcolm, 2009; Ziegler, Dearden, & Rollins, 2012), where it is often referred to as importance-satisfaction.

Linked importance-satisfaction items are listed in Table 2. Mean, standard deviation, gap analysis (mean importance minus mean satisfaction), and Wilcoxin t-tests were calculated for each importance performance item. In addition, a scatter plot of satisfaction versus importance means was created to provide a graphical comparison of the importance-satisfaction scores. There are two main types of analysis for this method. The original approach (Martilla & James, 1977) is to add crosshairs to divide the scatter plot into four sectors, representing 'keep up the good work' (high importance and high satisfaction), 'concentrate here' (importance > satisfaction), 'low priority' (low importance and low satisfaction), and 'possible overkill' (satisfaction >> importance). However, methods of where to place the crosshairs are subjective (Ziegler, 2012) and variable in the literature (e.g. Coughlan, 2012; Malcolm, 2009; Oh, 2001; Randall & Rollins, 2009; Rollins & Rouse, 1993). A less subjective method is the placement of an iso-line at 45^{o} from the origin of the scatter plot (e.g. Hawes & Rao, 1985; Slack, 1994; Abalo, Varela, & Manzano, 2007; Ziegler, 2012). The iso-line represents points where importance and satisfaction are equal; items above the line have lower satisfaction scores and represent areas where alternative or improved management is needed. Increased distance from the iso-line indicates increased discrepancy between importance and satisfaction. We employed the iso-line method. Mann-Whitney U-tests were performed between specialization types for each importance-satisfaction item.

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

RESULTS

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

The response percentages and mean score for each item used to create the specialization index are given in Table 3. The majority of respondents were classified as 'low' (30.9%) and 'intermediate-low' (53.3%), comprising 84.6% of the sample. Only 15.4% of the sample was classified in the two more highly specialized categories, 'intermediate-high' (13.2%) and 'high' (2.2%). Only three respondents were classified as 'high', therefore importance-satisfaction comparisons between specialization groups were restricted to 'low', 'intermediate-low', and 'intermediate-high'. Mann-Whitney U-tests indicate that there was no statistical

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	
2. 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	

difference between specialization groups for 'Highest level of education completed' ('low' vs. 'intermediate-low': U=1,326, p=0.801; 'low' vs. 'intermediate-high': U=404, p=0.187; 'intermediate-low' vs. 'intermediate-high': U=747, p=0.095). Table 4 compares the mean response for each item used to calculate the specialization index by specialization group. The results support the index cal-

culation method. Mann-Whitney U-tests show that the differences between each group for every item are statistically significant. Correlations between index item and specialization scores range from moderate to strong and all are significant at p=0.01.

Table 4: Mean scores, Mann-Whitney U-tests, and correlations between specialization groups for items 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)

[1] l='low', i-l='inte rmediate-low', and i-h='intermediate-high'

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

difference statistically significant, indicating higher satisfaction than importance.

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

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

Item	Importance		Satisfaction		Gap value	p
	mean	sd	mean	sd	(I-S)	
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

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

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

importance-satisfaction items (Table 6). In all cases the more specialized group possessed the higher importance or satisfaction.

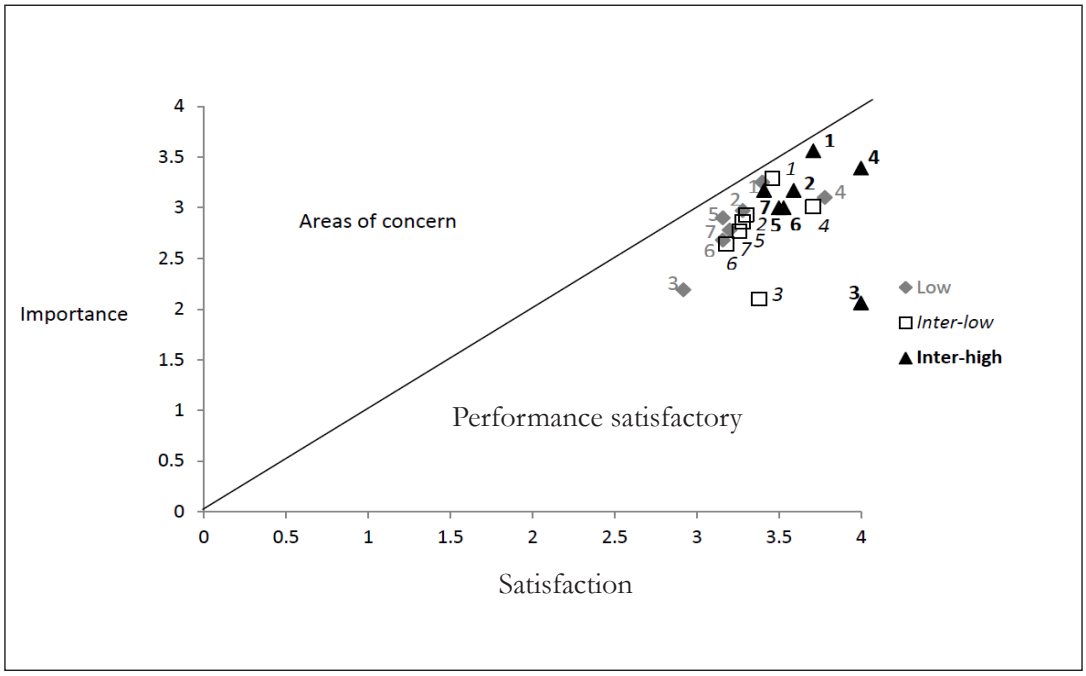

Figure 1: Scatter plot of importance versus satisfaction item scores for specialization groups

Table 6: Statistically significant differences (Mann-Whitney U-test) in importance and satisfaction 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)	

l='low', i-l='intermediate-low', and i-h='intermediate-high'. Bold indicates which group reported greater importance or satisfaction.

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

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)

DISCUSSION

The Canadian Fossil Discovery Centre appears to be a regional, family-centric destination that draws visitors to Morden as the primary or one of several reasons to visit the city. Currently, the majority of visitors appear to be first-timers. A larger venue could perhaps increase its range as a pull factor and provide the opportunity for rotating displays to attract repeat visitation. We were able to establish that visitors to the CFDC were compo-

sed of specialized sub-groups. The mean responses for each item used to construct the specialization index are significantly different between each group (Table 4). Overall, the respondents can be generally characterized as modestly specialized with respect to palaeontological experiences. Almost 85% of participants were classified in the 'low' and 'intermediate-low' groups, with only a small percentage in the 'intermediate-high' and 'high' groups. There is a correlation, particularly with respect to previous visitation to palaentology and nature museums, as well as previous number of learning media consulted, between increased previous experiences related to palaeontology heritage education and increased specialization. This correlation may provide the more highly specialized respondents with a greater context upon which to interpret the material presented in the CFDC displays.

Some of the comments from the open-ended section of the questionnaire likely reflect the modest level of specialization observed in the respondents. We received sixteen comments under "What did you dislike?" and fourteen under "What would you change?" (Table 7) that indicate the information presented with the displays was difficult to understand for some visitors. All respondents that made the comments above were classified as either 'low' or 'intermediate-low' in the specialization index. These results suggest, similar to the recommendations of Kerstetter, Confer, & Graefe (2001) and Malcolm & Duffus (2007), that given the majority of visitors were on the lower end of the specialization spectrum, particular attention should be paid by the executive of the CFDC to this group during development of interpretive displays and programs. In addition, the CFDC may want to explore which material may need more fundamental explanation or clarity. Kerstetter, Confer, & Graefe (2001) suggest that tourists on the lower end of the specialization spectrum for these types of activities may require a more interactive experience, which is evident in suggestions made by visitors to the CDFC (Table 7).

The findings above do not detract from the fact that each specialization group was satisfied with all of the expectation ite-

ms presented in the questionnaire. Visitors were very satisfied with their experience at the CFDC, regardless of specialization. For each item, satisfaction is statistically higher than expectation (Table 5) and none of the items fall into the "Areas of concern" zone above the iso-line in Figure 2. It is visually evident in Figure 2, however, that the expectation-satisfaction responses generally cluster higher with increasing specialization. This pattern is borne out by the results presented for three importance-satisfaction items in Table 6. In each case the more specialized group reported higher importance or satisfaction. This is consistent with Kerstetter, Confer, & Graefe (2001) but generally inconsistent with much of the specialization literature, which seems to follow the theory put forth by Duffus & Dearden (1990) that increased proportions of less specialized tourists can cause dissatisfaction in, and displacement of, more specialized participants. It is worth noting here that, like Kerstetter, Confer, & Graefe (2001), the research presented in this paper addresses specialization related to education-related tourism rather than recreational activity-related tourism (e.g. birding, scuba-diving, skiing, and whale-watching) to which other specialization literature refers. Caution should likely be taken in making direct comparisons between these two types of activities prior to further research into this area.

The items in Table 6 for which greater statistical expectation or satisfaction were found in more specialized visitors to the CFDC are all "learning" items. For the "viewing" items ('See ancient reptile fossils/skeletons' and 'See Bruce, the mosasaur'), there are no statistical differences in expectation or satisfaction between specialization groups. This finding may be explained by the suggestion of Jackson & Norton (1980) and Kerstetter, Confer, & Graefe (2001) that more highly specialized tourists are more interested in the "overall" experience. In this case, we propose that inclusion of the more detailed learning items results in a more complete experience, and higher satisfaction in particular, for more specialized visitors than just the main highlights of viewing 'Bruce' and the other fossils on display. Further, although small in

number, two comments were received in the open-ended section of the questionnaire indicating a desire to *increase* the amount of information provided. The comments were both made by visitors classified as 'high' in the specialization index. These results indicate that, although the CFDC appears to receive a much lower proportion of more highly-specialized visitors, the Centre should maintain and continue to develop in-depth interpretation.

While participants in this survey show high satisfaction with their experience at the CFDC, some of the comments in the open-ended portion of the questionnaire (Table 7) expressed concern about the limitations of the CFDC imposed by the small size of the museum and its location in the basement of a community centre. The relative lack of child-oriented displays and activities reflected in respondents' comments is also related to these restrictions. These concerns were also borne out in discussions with museum staff when the project was originally conceived. Although these comments are negative in and of themselves, they serve to indicate visitor desire, and couple nicely with local community and political support, for the development of an expanded facility for the Canadian Fossil Discovery Centre.

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

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