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Museum Learning Environments: Teachers' Preferences

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Conference Paper
American Educational Research Association
Chicago, IL
April 2003

Abstract

A survey was conducted among 139 elementary public, private, parochial, charter, and home school teachers to help Kingman Museum in Battle Creek, Michigan re-establish educational programming with area schools after having been closed for two years. The purpose of the study was to identify museum programs that teachers are most likely to use, the curriculum standards that those programs must meet, and teachers' preferences regarding museum program environments. The instrument was a 90-item self-administered questionnaire. The study used survey research methods approved by the Western Michigan University (WMU) Human Subjects Institutional Review Board. Results revealed that teachers were most likely to use in-class programs presented by museum staff or trained volunteers, staff-guided museum visits, traveling exhibits, resource kits, and planetarium programs; and were least likely to visit Kingman Museum multiple times in a school year. Teachers reported that meeting curriculum standards at all levels was very important with priority given to the following order: school standards, teacher's own classroom standards, state standards, national standards, and county intermediate school district standards. Teachers' preferred museum program environments that integrate hands-on activities, use a variety of learning styles and critical thinking skills, help students apply what they are learning to their daily lives, are equally fun and educational, involve physical activity during some or most of the visit, and allow students to learn with a partner or in teams. Teachers reported that the maximum amount of time they could devote to a Kingman Museum visit (not including travel time) was one to two hours.

Introduction

Education is the principal mission among museums and elementary teachers and their students comprise one of a museum's primary audiences. Offering the programs and experiences that teachers prefer is critical to a museum's success and teachers' decisions to visit museums with their students. Positive museum experiences enhance classroom instruction, maximize student learning, and encourage return visits. In the last decade, museum program and service development has focused on the quality and characteristics of experiences that maximize visitor engagement and learning. For example, informal learning environments, interactivities, learning styles, affective and cognitive factors, and other related experiences have been shown to effect general learning, behavior, attitudes about learning, and motivation among children (Gardner, 1999; Jenson and Dabney, 2001; Riding and Grimley, 1999). Research in these dimensions of learning is particularly valuable to educators in museum and other informal settings as they work to facilitate learning among their diverse audiences.

In a 1998 report of a survey of museum educators from museums throughout the United States, the Institute of Museum and Library Services (IMLS) identified a variety of factors that influence a school's decision to partner with a museum. According to this study, enrichment, the informal nature of museum programs, and the uniqueness of their resources were influential factors. Additionally, the survey identified the most popular programs and services offered by museums to teachers throughout the United States. These programs and services include the following, in priority order: staff-guided museum visits;

volunteer-guided museum visits; self-guided museum visits where teachers serve as their students' tour guide; multiple visits to a museum; museum staff visits to schools; pre-lesson followed by a museum visit; orientations to the museum for teachers; pre-lesson, followed by a museum visit, followed by a post-lesson; pre-service for teachers; resource kits/learning trunks for teachers to use in a classroom; in-service training for teachers; docent (i.e., trained volunteer) visits to schools; and traveling exhibits to schools.

Between 2000 and 2003, Kingman Museum, a natural history, science and cultural museum in Battle Creek, Michigan, was closed to the public while its ownership transferred from a public school to a nonprofit organization. To prepare the museum to re-establish educational programming with area schools when it re-opened in February 2003, a survey was conducted in 2002 among elementary-level teachers throughout Calhoun County, Michigan to identify programs teachers will most likely use, which curriculum standards museum programs should meet, and teachers' needs and preferences regarding museum program experiences. The IMLS study of museum educators guided this subsequent study of school teachers, which examined whether the programs and experiences reported by museum educators in the IMLS study were similar to the programs and preferences reported by elementary teachers. Survey findings were then used to guide to development of Kingman Museum's new programs. Although this survey was conducted specifically for Kingman Museum, the findings are relevant to museum planners and educators across the country that are interested in meeting teachers' needs and strengthening museum-school partnerships.

Methods

Population

School leaders (i.e., school principals, parochial school pastors, home school coordinators, etc.) in 55 Calhoun County, Michigan elementary schools received an invitation to participate and a follow-up letter. Addresses were acquired from the county intermediate school district directory. School leaders from 16 schools (29%) disseminated surveys to their 480 teachers. Elementary teachers (*N*=139, 29%) returned their surveys in sealed envelopes to their school leader who returned them to the first author, or teachers mailed their surveys directly to the first author.

Sample subjects included 139 elementary-level school teachers from public (*n*=101, 74%), private (*n*=8, 6%), parochial (*n*=16, 12%), charter (*n*=3, 2%), and home schools (*n*=9, 7%) schools (unreported, *n*=2) in 16 Calhoun County, Michigan schools whose school leaders (i.e., public school principals, parochial school pastors, or home school coordinators, etc.) consented to participate. Among the subjects, 127 (95%) were white, 2 (1%) were African American, 2 (1%) were Hispanic, and 3 (2%) were Other (unreported, *n*=5); 115 (85%) were Full-time teachers and 21 (15%) were Other (Part-time, Substitute, Home School) (unreported, *n*=3); 31 (23%) taught kindergarten or earlier, 70 (58%) taught

first through third grade, 56 (41%) taught fourth through sixth grade with most teachers teaching in more than one of the grade categories; 106 (78%) taught general elementary education with the remainder dispersed among early childhood, special education, and content-specific areas; 104 (76%) had visited the Kingman Museum before it closed. Elementary-level school teachers in Calhoun County, Michigan were sampled because 1) they comprised Kingman Museum's primary customers, 2) studies showed that teachers have the strongest influence on a school's decision to participate in museum programming (Institute of Museum and Library Services, 1998), and 3) teachers are able to describe their students' learning environment needs.

Survey Instrument

The survey instrument included a cover letter consent form and a 90-item self-administered questionnaire that took less than 30 minutes to complete. The questionnaire contained predominantly closed-ended questions with ordinal ("Not Likely" – "Very Likely"; "Not Important" – "Very Important") or categorical responses and five open-ended questions that were specific to Kingman Museum. The questionnaire was developed based on literature reviews and sample surveys including the 1998 IMLS survey, and then was piloted, revised, and disseminated to subjects by school leaders. Western Michigan University's Human Subjects Institutional Review Board approved the questionnaire and survey methods. Survey questions elicited the following information: 1) individuals and factors that may influence a teacher's decision to visit the museum, 2) subject area preferences, 3) needs and preferences regarding museum programs and experiences, 4) whether subjects had visited Kingman Museum before it closed, and 5) teaching and demographics information.

Study domains were selected based on literature reviews (Gardner, 1999; Jenson and Dabney, 2001; Riding and Grimley, 1999), museum audience analyses and teacher evaluations, and the 1998 IMLS survey. Teachers were asked their Kingman Museum program preferences regarding: 1) Curriculum standards that programs must meet, 2) Programs they will most likely use, and 3) Program environments. Program environments were defined as experiences that maximize student learning and cognitive development, enhance classroom instruction, and give students an overall positive museum experience that encourages return visits.

A 4-point Likert scale ranging from "Not Likely" to "Very Likely" was used to rate the likelihood that teachers would use any of 17 different museum programs. The variables and descriptions for each of the programs are listed below.

Variable	Description
Orient	Orientation to the museum for teachers
Insvc	Inservice workshops for teachers (continuing education units)
StaffV	Staff-guided museum visit
VolV	Volunteer-guided museum visit

SelfV	Self-guided museum visit
PreV-V	Pre-visit lesson followed by museum visit
PreV-V-PostV	Pre-visit lesson, followed by museum visit, followed by post-visit lesson
InclassS	Program presented in a teacher's classroom by museum staff
InclassV	Program presented in a teacher's classroom by a trained volunteer
ManyV	Multiple museum visits during the school year
TravelE	Traveling exhibits that can be displayed in a teacher's school or classroom
Planet	Programs using the museum's planetarium
Kit	Resource kits (trunks containing artifacts, instructional media, curricula, etc.)
ResRoomT	Resource room for teachers
ResRoomS	Resource room for students
InterGen	Inter-generational programs (matching youth with senior citizens)
InterGrade	Inter-grade programs (matching older students with younger students)

A 4-point Likert scale ranging from "Not Important" to "Very Important" was used to rate the importance that museum programs meet specific curriculum standards. The curriculum standards variables comprised the following: teacher's own (OWN) standards, school (SCHOOL) standards, county intermediate school district (COUNTY) standards, state (STATE) standards, and national (NATL) standards. To determine teachers' learning environment preferences, teachers were asked to select the most important experience from each of the three groups of experiences shown below.

Group #1: Learning Environments

- Integrate hands-on activities
- Have a unique educational experience
- Enrichment of general learning
- Use real objects
- Gather information from exhibits or displays
- Explore on their own
- Apply prior knowledge

Group #2: Cognitive Environment

- Use a variety of learning styles
- Use critical thinking skills
- Take responsibility for their own learning
- Use social skills
- Build self-esteem
- Use memory skills

Group #3: General Experiences

- Apply what they are learning to their daily lives
- Be in an environment that is safe to make mistakes
- Have time for group reflection
- Explore related careers

Four final questions asked teachers to identify their preferences for each of the following characteristics:

1. The ideal amount of time a museum program should devote to physical activity (i.e., none, some, half, most, all),
2. Their students' ideal social learning setting (i.e., on their own, with a partner, in teams, in a large group),
3. Their ideal mix of fun and education (i.e., mostly fun, mostly fun and somewhat educational, equally fun and educational, mostly educational and somewhat fun, and mostly educational),
4. The maximum amount of time they could devote to a museum visit, not including travel time (i.e., 1 hour of less, 1-2 hours, 2-3 hours, 3-4 hours, 4 or more hours).

Procedure

The school principal, pastor, or director of every elementary-level public, private, charter, and parochial school in Calhoun County, Michigan were contacted via a cover letter and a second follow-up letter and given an equal opportunity to participate in the survey (*N*=55 schools). School leaders from 16 schools (29%) showed their willingness to participate in the study by returning a letter on school letterhead to the first author. Participating school leaders were then mailed enough survey questionnaires for each teacher in their school (*N*=480 surveys). The questionnaires were disseminated to subjects by their school principals, pastors, or directors either during a staff meeting or via staff mailboxes. Subjects completed the questionnaires at their leisure, sealed them in specially marked envelopes, and then either mailed them directly back to the first author or returned them to the school principal who returned them to the first author. The timeline for the survey spanned February through July 2002. Introductory letters were mailed to school leaders February 19, 2002 and follow-up letters were mailed March 16, 2002 to those who did not respond to the first letter. Surveys were disseminated to subjects in March, April, and May 2002 and were received from them through June 2002.

A total of 139 teachers (29%) returned completed questionnaires. Of this figure, 295 questionnaires were delivered to public, private, parochial and charter schools and 128 (43%) were returned; and 185 questionnaires were delivered to home school families and 8 (4%) were returned (3 respondents did not indicate their school type). Several factors contributed to the response rate. First, many teachers elected not to complete the questionnaires because they believed their teaching responsibilities (i.e., physical education, language arts, fine arts, math, pull-out special education, library, etc.) were not relevant to Kingman Museum's mission of natural history, science, and culture. Second, some teachers taught in situations that prevented them from being able to visit the museum with a class of students. Third, school leaders varied in the amount of support they gave for this study. For example, some school leaders provided time during a staff meeting for teachers to complete the questionnaires;

whereas other leaders distributed the questionnaires to teachers only after several follow-up phone calls from the first author. Finally, the timing of the survey occurred when many teachers were preoccupied with end-of-school-year activities.

Results

Programs Likely To Be Used by Teachers

Descriptive statistics shown in Table 1 for the 17 Kingman Museum program variables are ordered based on the percent of "Very Likely" responses. "Very Likely" responses ≥30% identified the following six variables most likely to be used by teachers: InclassS (*n*=66, 49%), StaffV (*n*=54, 39%), TravelE (*n*=52, 39%), Kit (*n*=50, 37%), InclassV (*n*=49, 37%), and Planet (*n*=48, 36%). When the percent of "Very Likely" and "Moderately Likely" responses were combined for each of the 17 variables, results identified the same six variables as the top variables most likely to be used by teachers (responses ≥70%), but in the following order: InclassS (82%), Kit (79%), StaffV (75%), TravelE (75%), Planet (72%), and InclassV (71%). "Not Likely" responses ≥30% identified ManyV (*n*=54, 41%) as the variable least likely to be used by teachers.

Table 1
Descriptive Statistics for Program Variables

Program Variables	Very Likely	Moderately Likely	Somewhat Likely	Not Likely	Very & Moderately Likely Combined
InclassS (*n*=134)	**66 (49.25%)**	44 (32.84%)	15 (11.19%)	9 (6.72%)	**82.09%**
StaffV (*n*=138)	**54 (39.13%)**	49 (35.51%)	30 (21.74%)	5 (3.62%)	**74.64%**
TravelE (*n*=134)	**52 (38.81%)**	48 (35.82%)	19 (14.18%)	15 (11.19%)	**74.63%**
Kit (*n*=135)	**50 (37.04%)**	56 (41.48%)	20 (14.81%)	9 (6.67%)	**78.52%**
InclassV (*n*=134)	**49 (36.57%)**	46 (34.33%)	25 (18.66%)	14 (10.45%)	**70.90%**
Planet (*n*=133)	**48 (36.09%)**	48 (36.09%)	23 (17.29%)	14 (10.53%)	**72.18%**
PreV-V-PostV (*n*=132)	38 (28.79%)	40 (30.30%)	28 (21.21%)	26 (19.70%)	59.09%
Orient (*n*=135)	37 (27.41%)	32 (23.70%)	37 (27.41%)	29 (21.48%)	51.11%
PreV-V (*n*=133)	35 (26.32%)	54 (40.60%)	36 (27.07%)	8 (6.02%)	66.92%
ResRoomT (*n*=135)	34 (25.19%)	52 (38.52%)	38 (28.15%)	11 (8.15%)	63.71%
SelfV (*n*=138)	29 (21.01%)	39 (28.26%)	46 (33.33%)	24 (17.39%)	49.27%
Insvc (*n*=137)	27 (19.71%)	44 (32.12%)	44 (32.12%)	22 (16.06%)	51.83%
ResRoomS (*n*=135)	26 (19.26%)	43 (31.85%)	38 (28.15%)	28 (20.74%)	51.11%
InterGen (*n*=134)	24 (17.91%)	33 (24.63%)	47 (35.07%)	30 (22.39%)	42.54%
VolV (*n*=137)	20 (14.60%)	60 (43.80%)	44 (32.12%)	13 (9.49%)	58.40%
InterGrade (*n*=134)	16 (11.94%)	29 (21.64%)	53 (39.55%)	36 (26.87%)	33.58%
ManyV (*n*=133)	14 (10.53%)	31 (23.31%)	34 (25.56%)	*54 (40.60%)*	33.84%

Bold indicates variables most likely to be used (Very Likely ≥30%; Very & Moderately Likely Combined ≥70%); italics indicates the variable least likely to be used (Not Likely >30%).

Polychoric correlations between program variable pairs were used to identify variable pairs with moderate (0.4-0.6), high moderate (0.6-0.8), and very high (0.8-1.0) correlations. Table 2 shows polychoric correlations among the program variables ranged from .001 to .87. Correlations ≥0.20 are statistically significant, $\alpha \cong .05$ (2-tail). There was one very high correlation between InclassS – InclassV (.87). Eight high moderate correlations were revealed between the following variable pairs: ResRoomT –

ResRoomS (.79), PreV-V – PreV-V-PostV (.76), TravelE – Kit (.75), InterGen – InterGrade (.71), Kit – ResRoomT (.70), InclassS – TravelE (.66), Orient – Insvc (.64), and InclassV – TravelE (.63). There were seven moderately correlated variable pairs: Kit – ResRoomS (.58), StaffV – VolV (.55), ManyV – Planet (.50), TravelE – ResRoomT (.48), InclassS – Kit (.48), InclassV – Kit (.41), and Insvc – TravelE (.40).

Table 2
Polychoric Correlations between Program Variables

Variable	Orient	Insvc	StaffV	VolV	SelfV	PreV-V	PreV-V-PostV	InclassS	InclassV	ManyV	TravelE	Planet	Kit	ResRoomT	ResRoomS	InterGen
Orient	-															
Insvc	.64	-														
StaffV	.22	.26	-													
VolV	.13	.13	*.55*	-												
SelfV	-.06	-.09	-.001	.30	-											
PreV-V	.22	.21	.22	.07	.15	-										
PreV-V-PostV	.14	.35	.23	.10	.02	.76	-									
InclassS	.21	.32	.34	.10	.03	.05	.23	-								
InclassV	.09	.13	.16	.26	.15	-.01	.14	**.87**	-							
ManyV	.20	.22	.15	.09	.14	.19	.32	.08	.08	-						
TravelE	.37	*.40*	.15	.13	.01	.12	.10	.66	.63	.13	-					
Planet	.24	.32	.16	-.13	.10	.30	.30	.23	.16	*.50*	.24	-				
Kit	.33	.39	.33	.04	.03	.24	.17	*.48*	*.41*	.20	.75	.32	-			
ResRoomT	.30	.33	.15	.03	-.03	.05	.07	.26	.13	.24	*.48*	.23	.70	-		
ResRoomS	.18	.15	.18	.04	.05	-.03	.02	.31	.27	.31	.39	.20	*.58*	.79	-	
InterGen	.28	.26	.04	.16	.11	.12	.20	.27	.35	.36	.38	.18	.28	.29	.29	-
InterGrade	.14	.25	.17	.11	.06	.04	.17	.23	.23	.35	.24	.23	.25	.32	.29	.71

Correlations ≥0.20 are statistically significant, α≅.05 (2-tail). Moderate (.40-.60) correlations are italicized; high moderate correlations (.60-.80) are underlined; and very high correlations (.80-1.0) are bolded and underlined.

Importance of Meeting Curriculum Standards

Descriptive statistics shown in Table 3 for the five curriculum standards variables are ordered based on the percent of "Very Important" responses. All five curriculum standards variables were rated as "Very Important" (responses ≥30%). Ordering of the variables based on the percent of "Very Important" responses produced the following: SCHOOL (*n*=99, 73%), STATE (*n*=82, 60%), OWN (*n*=61, 46%), NATL (*n*=57, 43%), and COUNTY (*n*=53, 41%). When the percent of "Very Important" and "Moderately Important" responses were combined for each of the five variables, results revealed responses ≥77% for each variable with no change in their order: SCHOOL (93%), STATE (87%), OWN (82%), NATL (78%), and COUNTY (78%).

Table 3
Descriptive Statistics for Curriculum Standards Variables

Curriculum Standards Variables	Very Important	Moderately Important	Slightly Important	Not Important	Very & Moderately Important Combined
SCHOOL (*n*=136)	**99 (72.79%)**	27 (19.85%)	5 (3.68%)	5 (3.68%)	**92.64%**
STATE (*n*=136)	**82 (60.29%)**	36 (26.47%)	11 (8.09%)	7 (5.15%)	**86.76%**
OWN (*n*=132)	61 (46.21%)	47 (35.61%)	17 (12.88%)	7 (5.30%)	81.82%
NATL (*n*=134)	57 (42.54%)	48 (35.82%)	20 (14.93%)	9 (6.72%)	78.36%
COUNTY (*n*=130)	53 (40.77%)	48 (36.92%)	18 (13.85%)	11 (8.46%)	77.69%

OWN=teachers' own classroom standards, SCHOOL=school standards, COUNTY=county intermediate school district standards, STATE=state standards, and NATL=national standards. Bold indicates priority variables (Very Important ≥50%; Very & Moderately Important Combined ≥85%).

Teachers' Museum Program Environment Preferences

Tables 4a and 4b show the results of teachers' museum learning preferences regarding their students' museum experience in each of seven areas: learning, cognitive, and general environments; ideal mixture of fun and education; ideal amount of physical activity; social learning; and time. Responses ≥30% indicated teachers' museum program environment preferences. Results showed that teachers preferred museum programs that integrate hands-on activities (*n*=55, 40%), use a variety of learning styles (*n*=63, 46%) and critical thinking skills (*n*=45, 33%), help students apply what they are learning to their daily lives (*n*=82, 60%), are equally fun and educational (*n*=105, 77%), involve physical activity during some (*n*=55, 40.44%) or most (*n*=42, 31%) of the visit, and allow students to learn with a partner (*n*=62, 48%) or in teams (*n*=45, 35%). Teachers reported that the maximum amount of time they could devote to a museum visit (not including travel time) was one to two hours (n=55, 42%).

Table 4a
Teachers' Museum Program Environment Preferences

Environment Experience	*n* (%)
Learning (*n*=137)	
Integrate hands-on activities	**55 (40.15)**
Have a unique educational experience	38 (27.74)
Enrichment of general learning	18 (13.14)
Use real objects	15 (10.95)
Gather information from exhibits or displays	6 (4.38)
Explore on their own	4 (2.92)
Apply prior knowledge	1 (0.73)
Cognitive (*n*=136)	
Use a variety of learning styles	**63 (46.32)**
Use critical thinking skills	**45 (33.09)**
Take responsibility for their own learning	17 (12.50)
Use social skills	7 (5.15)
Build self-esteem	3 (2.21)
Use memory skills	1 (0.74)
General (*n*=128)	
Apply what they are learning to their daily lives	**82 (59.85)**
Be in an environment that is safe to make mistakes	36 (26.28)
Have time for group reflection	11 (8.03)
Explore related careers	8 (5.84)

Bold indicates responses ≥30%.

Table 4b
Teachers' Museum Program Environment Preferences

Environment Experience	*n* (%)
Ideal Mix of Fun & Education (*n*=136)	
Mostly fun	1 (0.74)
Mostly fun & somewhat educational	4 (2.94)
Equally fun & educational	**105 (77.21)**
Mostly educational & somewhat fun	25 (18.38)
Mostly educational	1 (0.74)
Ideal Amount of Physical Activity (*n*=136)	
None	3 (2.21)
Some	**55 (40.44)**
Half	35 (25.74)
Most	**42 (30.88)**
All	1 (0.74)
Ideal Social Learning Setting (*n*=129)	
On their own	10 (7.75)
With a partner	**62 (48.06)**
In teams	**45 (34.88)**
In a large group	12 (9.30)
Maximum Time for Museum Visit (*n*=130)	
1 hour or less	6 (4.62)
1 – 2 hours	**55 (42.31)**
2 – 3 hours	37 (28.46)
3 – 4 hours	20 (15.38)
4 or more hours	12 (9.23)

Bold indicates responses ≥30%.

Conclusion

This study showed that among the 17 Kingman Museum programs studied, teachers are most likely to use in-class programs presented by museum staff or trained volunteers, staff-guided museum visits, traveling exhibits, resource kits, and planetarium programs. Teachers are least likely to visit Kingman Museum multiple times in a school year. Subjects reported that meeting national, state, county, school, and teacher's own curriculum standards was very important and that these standards should be met in the following order: school standards first, followed by teacher's own and state standards, national standards, and finally county intermediate school district standards. Teachers' preferred museum program environments that integrate hands-on activities, use a variety of learning styles and critical thinking skills, help students apply what they are learning to their daily lives, are equally fun and educational, involve physical activity during some or most of the visit, and allow students to learn with a partner or in teams. Finally, teachers reported that the maximum amount of time they could devote to a museum visit (not including travel time) was one to two hours.

Results from this study were generally consistent with the literature (Institute of Museum and Library Studies, 1998) and with prior Kingman Museum audience analyses and teacher evaluations regarding teachers' program preferences. One exception was that the IMLS (1998) study identified multiple visits to museums among the most popular program offerings by museums to schools; whereas, this study found that multiple visits were the least likely to be used. Reasons for this may be due to the limited number of field trips teachers are allowed in a school year, the variety of arts and cultural destinations in the Southwest Michigan area, financial reasons, or other reasons specific to Kingman Museum. More research would need to be conducted. The results of this study were used to prioritize Kingman Museum's program development and prepare it to re-establish educational programming with schools when it re-opened to the public in February 2003. Findings were also used to strengthen grant requests, make personnel decisions, channel resources, guide strategic planning, and communicate with funders and stakeholders.

Although this study was specific to Kingman Museum, it is also relevant to the general museum field. For example, museum leaders may want to focus more on identifying school and teachers' classroom curriculum standards and less on county standards. Since teachers were not likely to visit a museum multiple times in a school year, museum leaders may want to strengthen their outreach programs to include or expand in-classroom presentations, traveling exhibits, and educational resource kits. Findings may also be used to help museum educators influence museum and school administrators, teachers and other school personnel, policy makers, home school educators, and parents; secure funding to strengthen museum-school partnerships; and direct future studies. For more information about this

study, please contact the first author at Kingman Museum, 175 Limit Street, Battle Creek, MI 49017, phone: 269-965-5117, fax: 269-965-3330, or email: dawn.mackety@wmich.edu.

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