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## **A Museum, Department of Education Partnership**

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### **Abstract**

Research suggests collaboration in academic activities can be challenging. The authors wanted to determine the impact of a partnership between a museum and a department of education when opportunities arose to externally evaluate a Center at the museum. Additionally, we wanted to examine whether goals of the Center and the department were met by understanding participants' knowledge and experience gained as a result of a visit. Findings determined goals of the museum and the department were met and the impact of the partnership was noteworthy.

### **Introduction**

The incidence of external collaboration in academic research activities is increasing as a result of policy measures aimed at fostering partnerships between and among universities and with private organizations (Abramo, D'Angelo, & Di Costa, 2008). One such collaboration took place between the Museum of the Rockies (MOR) and the Department of Education at Montana State University (MSU) in Bozeman, Montana. The Museum, which is both a collegiate level division of MSU and an independent non-profit organization, sought expertise in an external review of their new *Explore Yellowstone Children's Discover Center* (CDC). The Museum partnered with students from the Department of Education who were taking *Assessment, Curriculum, and Instruction*.

The Children's Discovery Center is designed to connect science, nature, and the wonders of Yellowstone National Park, USA to children from birth to eight years of age. The immersive environment of the Center engages young children in play-based learning experiences. Eight discovery zones, each with a focus on a different area of Yellowstone, provide enough design, detail, and props to suggest a time and place for children to become a part of Yellowstone. A mix of experience and play allows for a range of learning experiences driven by three primary goals of the Center: 1, to connect very young children to science, 2, to foster an understanding of

and appreciation for the natural wonders of Yellowstone, and 3, to encourage children to connect with nature (MOR, 2008).

*Assessment, Curriculum and Instruction* (EDU 382) is a required course in the Department of Education. The course is designed to help future teachers be knowledgeable about classroom assessment. The course gives students the chance to develop classroom assessments but not to put them into practice. Students in the course agreed to the opportunity to develop a partnership with the MOR and become external evaluators of the new Center. Using pre-, formative, and summative assessments in the Center was critical for an authentic assessment learning experience. The three primary goals of the Department and this partnership were based on core teaching standards developed by the Council of Chief State School Officers (2011): the teacher 1, balances the use of formative and summative assessment as appropriate to support and document learning, 2, effectively uses multiple and appropriate types of assessment data to identify each student's learning needs, and 3, knows how to analyze assessment data to understand gaps in learning.

The purpose of this study was to determine whether the goals of the Center were met through understanding participants' interactions in the exhibit and the knowledge and experience gained as a result of visiting the Center. Additionally, we wanted to see the impact of the partnership between the Museum and the Department of Education when opportunities to externally evaluate the Center arose. For the purpose of this study, participants will also be addressed as visitors and/or subjects, college students will be addressed as student researchers or preservice teachers, and partnership refers to organizational pairings that can be formal or informal endeavors (Eddy, 2010). To guide this research, the following question was posed: What impact did the partnership between the Museum and the Department of Education have on determining whether Center and Department goals were met?

## **Review of the Literature**

### *Collaboration*

There is a well-established trend of using specific measures to foster scientific collaboration at institutional levels since knowledge sharing among researchers is believed to be conducive to a considerable increase in research effectiveness (Adams et al., 2005). The use of collaboration has increased and gained importance in the domain of scientific research at institutions of higher education over the last few decades (Abramo et al., 2008). This is no different at Montana State University where it is encouraged to develop partnerships among institutions, departmental alliances across institutions, or with university programs that partner with community agencies (Eddy, 2010). The challenge of this research was determining ways to better connect museums and other informal learning institutions to the formal school world. These partnerships do exist, but the endeavors are only sometimes successful (Robelen, 2011). Kezar (2005) agrees, "As a result of both the external pressures and the known benefits of collaboration, many higher education institutions are trying to create...interdisciplinary research and teaching. However, over 50% of collaborations fail" (p. 831). In this research the authors want to share their success through partnership efforts.

### *Measuring Learning in Informal Settings*

Informal learning environments play a critical role when considering learning as being broader than a regular school setting. The National Research Council reports that informal learning, the kind that takes place in museums, science centers, and afterschool programs, can jump-start and sustain long-term interests that involve complex learning (News report on science learning, 2009). In order to understand the implications for the mission of museums, visitors' interaction and learning must be addressed. Educators and researchers struggle with aspects of measuring learning in the informal education community (Bell, Lewenstein, Shouse, & Feder, 2009). Understanding the nature of the museum experience implies understanding the reasons for an educational approach that considers visitors' perspectives and active participation. When making decisions about educational exhibits museum curators take into account how visitors learn in museums. What is important is not what the museum transmits to, or asks of its visitors, but what visitors experience (Roberts, 1989). Falk and Dierking (2000) pose a similar idea. Instead of asking *What does the visitor learn as a result of visiting a museum exhibit?*, "a more realistic question is *How does the visit contribute to what a person believes, knows, feels and is capable of doing?*" (p. 12). Learning in museums is free-choice learning and this learning tends to be personally motivated, involves substantial choice on the part of the learner as to what, when and where to learn, and it is nonlinear (Falk & Dierking, 2000). Visits to museums and other informal environments are typically isolated and brief, making it problematic to separate the effects of a single visit from the merging of factors adding to positive learning outcomes (Bell et al., 2009). "People do not learn things in one moment in time, but over time," (Falk & Dierking, 2000, p. 12).

### **Methodology**

The field of investigation is the *Explore Yellowstone* Children's Discovery Center at the Museum of the Rockies during the months of February and March, 2011. Most visitors to the CDC were local residents. The timeframe reflects the high number of visitors, age zero to five, but for IRB compliance, only children age five to eight were considered for data purposes. Student researchers collected data from 51 participants. Data were obtained from pre- and post-surveys aligned with the goals of each discovery zone and observation forms (length of stay at each discovery zone and student researcher reflective assignments). The student researchers were second semester sophomore or first semester junior teacher education students taking the mandatory *Assessment, Curriculum, and Instruction* course.

As participants entered the Center, a student researcher asked permission for visitors of the appropriate age to participate in the research. Parents/Legal guardians signed a consent form to give permission. All visitors age five to eight were considered for this study. Although the Center visitors selected to be interviewed and observed, the sample was representative of visitors to *Explore Yellowstone* Children's Discovery Center.

Quantitative and qualitative data was used in this research. Student researchers orally completed the "pre-survey" with a participant before he or she began his/her visit to the Center. Each subject was then stopped at the exit of the Center and questioned about their comprehension of the educational goals using the "post-survey." A *t*-test for nonindependent samples was used because it determines whether a significant difference exists between the means for one sample at two different times (Gay, Mills, & Airasian, 2012). The "Observation Form" was used to record the length of time subjects were at each discovery zone and total time in the Center and

their paths were recorded on a map. Participant data included age, the frequency of visiting the center, and previous visits to Yellowstone National Park. A correlation was used for participant age and results on the pre-survey, number of visits to the museum, and post-survey results.

Student researchers conducted the interviews and observations and reflected upon four questions regarding their experiences using assessments to inform instruction. Written descriptions by the students were analyzed for themes to discover the meaning of their experiences and those of the participants'. This analysis guided the authors of this study toward decisions related to impact of the partnership between the MOR and DOE whether goals were met by both divisions of MSU. The qualitative findings in student researcher reflections helped identify key information. Data was gathered and then reduced by categorizing and coding student researcher and participant experiences (Creswell, 2012). These conclusions were used to examine preservice teachers' reflections of their use of assessment strategies and observations at the MOR.

## **Findings**

### *Quantitative Analysis*

The authors chose to use the *t*-test for nonindependent samples to determine whether a significant difference exists between the means for one sample at two different times (pre- and posttest results) (Gay et al., 2012). A nonindependent samples *t*-test indicated that the scores were significantly higher for the posttest ( $M = 3.9$ ,  $SD = 1.55$ ) than for the pretest ( $M = 3.4$ ,  $SD = 1.47$ ),  $t(50) = 3.05$ ,  $p < 0.004$ . The slight mean increase indicates that more participants improved their score.

A correlation is used to determine the degree of association between two or more variables in a study (Creswell, 2012). A Spearman correlation was computed to assess the relationship between the frequency of participants' visits to the Center and how they answered the post-survey. There was no relationship between the two variables,  $\rho = .049$ ,  $n = 51$ ,  $p = .734$ . A Spearman correlation was also computed to assess the relationship between the age of the participant and how well they answered the post-survey. There was a significant relationship between the two variables,  $\rho = .362$ ,  $n = 51$ ,  $p = .009$ .

### *Qualitative Analysis*

Student researchers' reflective comments upon questions regarding their experiences using assessments at the MOR emphasized both the meaning of their experiences and those of the participants'. The reflections that were answered similarly are the items shared.

Student researchers shared findings concerning participant knowledge gain and use of the Center. Findings shared were:

- She loved the camping site and the fire tower and thus she got all those questions correct. She did not spend much time playing in the Yellowstone Lodge and thus got those questions wrong.
- I noticed that the answers he had gotten correct were generally over topics he had explored with his mom present. During the time spent running around on his own, he didn't seem to learn as much.
- In reflecting upon the answers that children gave in the survey, it was clear that the older the students were, the more accurate their answers.

- When I asked him the questions at the end of his visit, he seemed to know the questions, but I think he had prior knowledge about camping and Yellowstone.

Their reflections on their experiences using assessments in the CDC were:

- I learned that kids at such young ages may need more direction in “learning” their way through the museum. They are not stopping to read or find out what it is.
- While someone is in the process of learning, it helps to have someone there to ask questions of when something doesn’t make sense.
- I learned that children enjoy learning about new information when the activity is fun and exciting.
- They can learn without knowing it but asking questions while they play will take their learning to a new level.

Their reflections on what they learned about assessments were:

- I see the purpose of reinforcing why the students are doing a task.
- Taking notes of who participates in class discussion or who answers questions in class is a great way to see which students are understanding or trying to understand what is being taught.
- Some sort of structure seems to help all the way from pre-assessment to summative assessment.
- A good teacher will never just use one type of assessment; they will mix them up and use several.

### **Discussion and Recommendations**

The purpose of this study was to determine whether the goals of the Children’s Discovery Center and the Department of Education were met by interpreting student researchers’ reflections of participants’ interactions in the Center and the knowledge and experience gained as a result of visiting the Center. The specific question was: What impact did the partnership between the Museum and the Department of Education have on determining whether Center and Department goals were met?

The impact the partnership had on attainment of goals by both constituents was noteworthy. Student researchers were able to visit the Museum as external evaluators and were able to report findings directly aligned with the Center’s goals. Using oral pre- and post-survey assessment techniques, preservice teachers discovered that participants improved in their understanding of the natural wonders of Yellowstone. It is possible that participants were more aware of what topics to observe as they traveled through the Center which further prepared them for the post-survey, as pre and post survey items were identical. Since literacy levels may influence a participant’s ability to fully learn about the Center exhibit, the older children scored higher on the post-survey. Using observation techniques, preservice teachers found that when becoming actively involved in a discovery zone, participants learned about science and gained an appreciation for the natural wonders of Yellowstone even more so when an adult guided them through the Center. They observed that when students had prior knowledge of, or experience with elements of the Center, they knew more.

Student researchers were also able to reflect on the meaning of their experiences as they aligned with goals of their department. They reported the importance of using a variety of assessments to document student learning and letting students know why they were learning what they were learning. They were able to use multiple assessments and data to report results of participant learning. Using observation specifically, student researchers were able to analyze their reflections to understand the gaps in learning that were visible as subjects took part in the Center.

While the results of this study are not generalizable to all informal learning environments and campus departments, they can be used for some general recommendations and focus for those aspiring to build partnerships. Recommendations and suggestions for how institutions of higher learning can use these results for their own unique situations are as follows: 1, create a partnership based on shared goals, values, and expectations, 2, build on the partnership even though research has concluded, 3, use results to maintain or encourage funding from foundation grants, and 4, use results for additional academic collaborations.

In conclusion, this study provided information about a successful partnership that was created as a result of two divisions of MSU needing to meet goals of their programs. The study found that the impact the partnership had on attainment of goals by both constituents was noteworthy. College divisions or organizations can use these results to make decisions about their collaboration and partnership efforts as well as follow the recommendations and suggestions provided above to apply to their own institutional environment.

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