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Abstract

This paper provides an overview of our team's (Diket, Xu, & Brewer) secondary analysis of 2008 Visual Arts NAEP restricted data and public access data since 2010. Authors discuss what we have learned about student art learning as seen in visual arts assessment data and the four subsequent publications. The rationale for our pursuit of these types of investigations is discussed; and, why we think this type research and its findings are so significant for the field of art education. We provide a look ahead at the upcoming administration of the 2016 NAEP Visual Arts Assessment and what we hope to do with these new data.

Fellows Forum: NAEP (RE)Cycling toward 2016

In this overview of our (Diket, Xu, & Brewer) work on the secondary analysis of 2008 Visual Arts NAEP restricted data we review our investigations of public access data since 2010. We discuss what we as NAEP secondary researchers have learned about student art learning and visual arts assessment through the 1997 and 2008 examinations. Four publications put forward an *Aspirational Learning* model (2014), while reflecting upon the significance of art instruction provided by full time certified art specialists. We discuss the reasons why we have pursued multiple methodology investigation and how we postulate these interrelated findings are significant for the field of art education. Lastly, we discuss the upcoming administration of the 2016 NAEP Visual Arts Assessment and what our hopes are for examining these new data.

Theoretical perspective(s)

The history and theoretical background about the NAEP Visual Arts Assessments (Diket & Brewer, 2011) provides the foundation for our ongoing research. In 2010, Emmanuel Sikali, NAEP secondary analysis training coordinator, who worked closely with NAEP Arts 2008, said that NAEP was an *aspirational test* because of its high achievement ceiling. The bar was set high to produce a constant incentive and to reflect escalating performance expectations in all NAEP tested subject areas. The *Aspirational Learning* model we hypothesize, tested, and determined moves from art knowledge to technical knowledge to aesthetic knowledge to meaning in a sequential manner. Technical knowledge appears vital to outcomes associated with developing aesthetic understanding and articulating meaning. We termed the path “aspirational” because constructed response NAEP problem blocks require responders’ dedicated attention to

gathering a body of knowledge, recording growing understanding through detailed critical analysis, comparing back their own findings to aesthetic expectations of a field, with an aim of establishing a clear meaning for the exercise by the final answer (Diket, Xu, & Brewer, 2014).

Mode(s) of Inquiry

There were a variety of modes in inquiry used in the three publications we will briefly discuss in the session.

NAEP Data Explorer data analysis (web based through the ed.gov interface) was reported out prior to the restricted data release. Statistical tests based on *ex post facto* data approximated *t*-tests (p set at or below .05), with appropriate adjustments made for multiple comparisons. With the online tools and NAEP, a *t*-test for independent samples is used to compare population means where there is no overlap in sampled students representing these populations (NCES). (Brewer, T., Xu, L., & Diket, R., 2017).

In our NAEP secondary analysis of restricted data, SPSS was used for data preparation and LISREL software to conduct structural equation modeling (SEM) analysis. Polychoric correlation matrix was employed to generate the model fit statistics and path diagram with 13 variables and four constructs. (Diket, R., Xu, L., & Brewer, T., 2014).

With Xu, L., Diket, R. M., & Brewer, T. (2015) data visualization formats were used to bring clarity of the *aspirational model* to a broader audience through knowledge visualization technology, via thematic mapping. In this study, we explored double articulation of signs in natural and programming languages and demonstrated through knowledge representation the means by which complex primary and secondary statistical

data can be understood in a disciplines own notation and articulated across disciplines with symbolic means.

Significance

The significance of this study is found in the applications of statistically based research. PK-20 visual arts educators can operationalize the *aspiration* learning approach when visual arts curriculum, instruction, and assessment are first guided by aggregating arts knowledge and employing technical knowledge and skills. This approach leads to determining predominate aesthetic properties in artworks, to interpreting supported meanings in the exemplars, and to the interpretation of meaning in making their own artworks (see Figure 1 and Table 1). The full-time art specialists in the NAEP assessment who tacitly or specifically understand how to employ an aspirational approach may be the link or reason why their students significantly out performed other students as found by Brewer, Xu, & Diket in 2017 (see Table 2). So what might this mean to you when developing art curriculum and related assessments? It likely means that you cannot teach art knowledge such as art history or appreciation detached from technical knowledge and skills and expect students to be able to grasp the aesthetic properties or meaning of a work. Learners need to know and use art based technical and skill-oriented knowledge to go to higher levels of aesthetic awareness and meaning based interpretation.

Last and most significant, our findings relate student learning, curriculum and instruction, arts assessment methods, and art education policy. Our conclusions have significant implications for curriculum designers, principals, and decision makers in the field of visual arts education. At the same time, the *aspirational model* we unraveled provides statistical evidence for attention to question presentation in seeking to fully

record test takers' achievement to art. Assessment experts and visual arts educators are advised to consider presenting the visual arts assessment questions in the order of engaging with personal meaning, querying arts knowledge, establishing technical knowledge and skills, and supporting awareness of aesthetic properties and meaning inferences associated with art works. The order funds a richly developed, investigative approach likely to have relevance to student learning in middle school.

The NAEP is scheduled for national testing in the arts in March 2016. We expect to find evidence of national curricular incentives reflected in student responses. Far from being a simple projection, much depends upon NAEP Arts 2016 being treated as a longitudinal study, wording that has appeared in the call to schools. As emphasis has been placed in visual art on critical analysis and socially minded interpretation (jagodzinski, 2012) that can be documented in the upper ranges of NAEP question blocks.

“Big Data” from NAEP, collected between January 25 and March 4, 2016

An estimated sample of 8000 students in eighth grade was scheduled to undergo testing in music or visual arts in late winter. NAEP 2016 again asks students to observe, describe, analyze and evaluate existing exemplars in the two disciplines. Results will inform “principals, teachers, parents, policymakers, and researchers” about progress to date and how education might be improved in the US. Visual arts test administration takes approximately 120 minutes, including transition and directions. Additionally, students will complete questionnaires that query educational experiences in and outside of school. Separately, the school principal completes a school-based questionnaire. Together, the questionnaires provide a context for achievement data and establishes

factors “that may be related to student learning”

(https://nces.ed.gov/nationsreportcard/subject/about/pdf/schools/naep_in_your_school_arts_2016.pdf). In a sample letter intended for notification of families, parents are

encouraged to ask test takers to “do their best”

(www.isbe.net/assessment/pdfs/naep/2016/arts-sample-parent-ltr-8.doc).

What do research summaries tell stakeholders?

Sandra Ruppert, Michael Sikes, and Laura Smyth, reported in Sept. 2009 their “AEP Analysis of NAEP Arts Assessment Results” (<http://www.aep-arts.org/wp-content/uploads/2012/03/NAEPAnalysis.pdf>):

But here, as elsewhere, the data provoke more questions than they answer. A panel member at a recent conference remarked, “This is not evidence of an achievement gap, but of a teaching gap” (Panelist, AEQ Conference, Seattle, June 19, 2009). The data from administrators portray enormous deficits. Entire schools (representing 16% of students) offer no music instruction or offer it less than once a week. The results for visual arts are even more serious—24%. These numbers mean that “instruction” hardly exists in these schools, provided that you define instruction as having definable scope and sequence. How do these deficits play out unequally among affluent and impoverished school districts, and with what consequences for minority children—consequences reflected in the NAEP achievement data? Here, again, the data are dismaying in their implications: Students from lower-income families (students eligible for free/reduced-price school lunch) scored 28 points lower in music and 9 points lower in visual arts than students who were not eligible. Students who attended city schools had lower

average scores than students who attended suburban, town, and rural schools—differences of 13, 14, and 8 points respectively. The average responding score in music for eighth-graders in public schools was 14 points lower than the score for students in private schools and 10 points lower in visual arts.

What to expect?

As this paper is written, NAEP 2016 is underway in schools. If this is indeed a longitudinal study, we can expect to see evidence of effective art teaching embedded in the data set. Sophisticated statistical techniques will allow our team to follow and hopefully affirm the statistical relationships that appear to structure the question sets for participants in NAEP. The influence of home is likely to remain evident, as are differences in opportunities to study visual art in schools; these are known factors in arts achievement. As a field, art educators must readdress what art learning looks like in NAEP. Particularly important is the continuing import of critical methodology and supported reasoning about art. While the 2014 formally adopted Arts Alliance standards (see 2014 NAEA poster design; State Education Agency Directors of Arts Education, on behalf of National Coalition for Core Arts Standards; digital available at www.natioanlartsstandards.org) figure into the worldview goals expressed in the NAEP Arts frame, the longitudinal restraints of the problem design for 2016 may not reveal data about the change in emphasis from methodological proficiency to ideological understanding. In addition, NAEP will not likely capture the direct import of media arts standards, released in 2014 with the visual arts standards.

Fortunately, NAEA continues to invest in the assessment of visual arts learning by publishing secondary analyses, distributing curricular materials and explanations, and

maintaining an informative web site for members and the public. Much can be learned in this cycle about the rate of change, the impact of curricular incentives and practices in art rooms, and the presence of knowledgeable teachers in schools. We can also expect a survey of the field practices to follow NAEP. Surveying teachers directly, and their practices, gives us a background against which to measure what is contributing or hindering students' achievement in visual art.

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Figure 1. Lihua Xu, Read Diket, & Thomas Brewer, Model A: Path Diagram for the Four Visual Arts Constructs (© 2014, L. Xu, R. Diket, & T. Brewer. Used with permission).

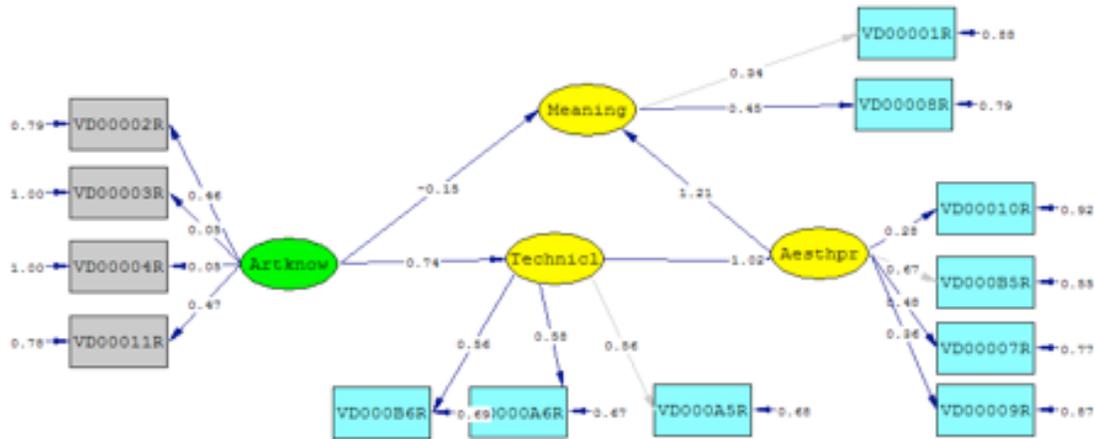


Table 1. Read Diket, Lihua Xu, & Thomas Brewer, List of Coded Mother/Child Questions by Construct (Refer to Figure 1), (© 2014, L. Xu, R. Diket, & T. Brewer. Used with permission).

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- VD00001 – Explain what artworks 1-5 are about. (Meaning Question)
 - VD00002 – Which artwork 2-5 is twentieth century western art? (Knowledge Question)
 - VD00003 – Artworks 2-5, which style contributes to western art? (Knowledge Question)
 - VD00004 – Which statement about artwork 4 is true? (Knowledge Question)
 - VD000A5 – Three specific things about distance in artwork 3. (Technical Question)
 - VD000B5 – Compare artwork 3 with artwork 1. (Aesthetic Question)
 - VD000A6 – Details of hands from artwork 1 and 3. (Technical Question)
 - VD000B6 – How artist of artwork 1 used light with hand. (Technical Question)
 - VD00007 – Three comparisons of artworks 3 and 4. (Aesthetic Question)
 - VD00008 – What artist communicated in artwork 5? (Meaning Question)
 - VD00009 – Specific things about artwork 1. (Aesthetic Question)
 - VD00010 – Which best describes style of artwork 1? (Aesthetic Question)
 - VD00011 – Artworks 1, 3, 4, & 5; which painted during renaissance? (Knowledge Question)

Table 2

Difference in Average Scale Scores of Visual Arts Taught and Not Taught by Full-time Specialist

	National	National Public	National Private
	<i>M (SE)</i>	<i>M (SE)</i>	<i>M (SE)</i>
Yes	152 (1.6)	151 (1.6)	160 (8.3)
No	142 (3.0)	140 (3.0)	155 (8.9)
Difference (Yes vs. No)	$p = .01^*$	$p = 0.004^{**}$	$p = .68$

Note. M = mean; SE = standard error.

*** $p < .001$; ** $p < .01$; * $p < .05$.

From Table 2, we see that independent *t*-tests (comparing differences of means between two groups on one variable) were statistically significant in the visual arts scale scores taught by full-time specialists for both national and national public jurisdictions. For both jurisdictions, the mean scale scores were higher for classes taught by full-time specialists (national: $M = 152$, $SE = 1.6$; national public: $M = 151$, $SE = 1.6$) than when classes were not taught by full-time specialists (national: $M = 142$, $SE = 3.0$; national public: $M = 140$, $SE = 3.0$). There was no statistically significant difference for national private classes taught by full-time specialists ($M = 160$, $SE = 8.3$) and by other teachers ($M = 155$, $SE = 8.9$). *The table indicates that the effectiveness of an art education is reduced when not taught by a full-time specialist faculty member. We theorize that full-time teachers have more impact on visual arts presence in schools.*