THE RELATIONSHIP BETWEEN GAME ART STUDENTS' ACHIEVEMENT AND THEIR PERCEIVED QUALITY OF ASSESSMENT

by

Nicole Lesher

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Liberty University

2022

THE RELATIONSHIP BETWEEN GAME ART STUDENTS' ACHIEVEMENT AND THEIR PERCEIVED QUALITY OF ASSESSMENT

by Nicole Lesher

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

Liberty University, Lynchburg, VA

2022

APPROVED BY:

Nathan Street, Ed.D., Committee Chair

Constance Pearson, Ed.D., Committee Member

ABSTRACT

The purpose of this quantitative, non-experimental, predictive correlational study is to analyze the relationship between Game Art students' perceptions of quality of assessment practices in higher education and their achievement of learning. Assessment in higher education has become increasingly significant due to accreditation and regulatory requirements around accountability of student outcomes. Institutions must commit a high level of resources toward appropriate assessment practices in order to answer tough questions about the value of higher education. This work has been met with adversity by students and educators, often resulting in overextended departments and poor-quality assessment practices. Questions pertaining to the benefits of assessment are normal on college campuses. Of particular concern is the influence of assessment on students, particularly game art students whose work is more complex to assess. This study included a convenience sample of 70 undergraduate game art students from a small art college in Southern California. Perception of assessment was measured via the Students' Perceptions of Assessment Quality Questionnaire survey and achievement of learning was measured via the results of advancement portfolio reviews completed by faculty. Multiple regression analysis results concluded the overall model was significant, therefore the null hypothesis was rejected at the 95% confidence level. Two predictors (*effectiveness of assessment* and *conditions of assessment*) were significant, two (*fairness of assessment* and *authenticity of assessment*) were trending toward significance, and two (*interpretation of assessment* and *credibility of assessment*) were not significant. This study supports that there is a predictive relationship between Game Art students' perceptions of quality of assessment practices in higher education and their achievement of learning, building a foundation for further research. Findings imply that

if assessment practices are designed to elicit more positive student perceptions, achievement of learning outcomes will improve.

Keywords: higher education assessment, arts assessment, perceptions of assessment

Dedication

This dissertation is dedicated to my loving husband, Ted Lesher, and my best friend Mary Seelhoff. Ted not only supported my education financially but also let me cry on his shoulder many times. He encouraged and supported me throughout this journey and believed in me when I stopped believing in myself. I especially appreciated him serving me breakfast in my office most weekends! Mary was literally an angel and bought and delivered my groceries regularly, so I had time to do homework. She also continually sent me messages of support and encouraged me when I was feeling like I couldn't go on anymore. Without these two amazing people, I would not be where I am today.

Acknowledgments

I would like to acknowledge my dissertation chair Dr. Nathan Street. Dr. Street encouraged me when I was losing hope, prayed for me when I needed it the most and was patient beyond belief. His positive attitude and gentle support were instrumental in my success. Without his caring guidance I'm not sure I would have persevered.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

Approaches to learning and studying inventory (ALSI)

Assessment for Learning (AfL)

Deming's Plan-Do-Study-Act continuous improvement process (PDSA)

Students' Perceptions of Assessment Quality Questionnaire (SPAQQ)

Valid Assessment of Learning in Undergraduate Education (VALUE)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this quantitative non-experimental predictive correlational study is to evaluate the potential for Game Art students' perceptions of assessment practices in higher education to influence their achievement of learning outcomes. Chapter One provides the framework for this research study by examining the background of assessment in higher education and how it might affect students. The problem statement addresses recent literature on this topic. The chapter proceeds to define the purpose and significance of the study followed by a statement of the research question. The chapter culminates with key definitions to help the reader better understand the content.

Background

Assessment of student learning in higher education has evolved over time. The last few decades, however, have brought about a shift in the focus of assessment away from student learning and towards accountability and compliance (Ariovich et al., 2019). It could be argued that this shift has resulted in tensions pertaining to assessment (Jones et al., 2020; Wass et al., 2020). A negative response to assessment has been found to dramatically influence the results on the assessments (Jones, et al., 2020; Preston et al., 2020; Wass, 2020). Thus, it is critical for higher education institutions to understand how students' perceptions of assessments influence their learning (Gerritsen-van Leeuwenkamp et al., 2019, Lynam, 2018).

Of particular interest in this study is the assessment of students enrolled in a Game Art progam. This interest originates from the researcher's personal background in working with department chairs of art and design programs to assess student learning. Based on this assessment experience, the researcher established a sense that art students were experiencing

significant anxiety in relationship to the portfolio assessment process used to determine readiness for advancement in their academic program. While assessing student learning outcomes across programs, there may exist a relationship between students' perception of the quality of the assessment and their actual achievement of learning outcomes for the program. All programs at the researcher's institution pertain to the creation of representative art and design. The Game Art program was specifically selected due to the significant number of students going through advancement review at the time of the study, thus increasing the probability of attaining an acceptable sample size for this research.

Historical Background

The focus of assessment practices in higher education has changed throughout history. Assessment was originally understood as a means, according to one source, "to make judgements about students' work, inferring from this what they have the capacity to do in the assessed domain, and thus what they know, value, or are capable of doing" (Joughin, 2009, p. 16). The 1980s, however, brought about a transference of assessment from simply grading individual student work to methodically assessing student learning outcomes (Kuh & Ewell, 2010). With this new focus, Kuh and Ewell defined assessment as a "systematic process of gathering evidence of the extent to which groups of students . . . perform in the aggregate in attaining particular levels of knowledge or skill, in order to judge effectiveness or improve provision" (Kuh & Ewell, 2010, p. 11).

The national focus on assessment was escalated in response to accreditors adding assessment of learning outcomes to their standards in 1990 (Ewell, 2010). Currently, higher education accreditation standards include very specific requirements for the application of assessment data to make informed decisions (Suskie, 2016). This expectation has only increased

as accreditation standards continue to skew heavily toward assessment practices and the implementation of data for improvement (Ewell, 2010). In the mid-2000s, the United States experienced a significant increase in attention on assessment as the focus shifted toward higher education's role in workforce development (Goertzen, 2012). Specifically, the Secretary of Education's Commission on the Future of Higher Education, known as the Spellings Commission, sought to ensure colleges were preparing graduates for employment (Spellings, 2006). This commission further emphasized assessment for accountability in higher education. Later, the Obama Administration focused more on accountability of higher education institutions, thus emphasizing the need to report on student outcomes through the application of assessment data (Suskie, 2016).

Social Context

Modern assessment practices can be used to hold higher education institutions accountable to the public. Today, colleges and universities are highly competitive and experience much scrutiny from the government, future students, parents, the media and the public. Thus, higher education institutions need to be able to deliver on their promises (Brumwell, 2017; Wass, 2020). Ariovich et al. (2019) described assessment as depicted as causing tension especially in relationship to improvement and accountability. Similarly, Tavares (2017) depicted higher education as inclusive of a *corporate* framework in which accountability is the catalyst where departments perceive they are being inspected for the purpose of finding fault. This bureaucratic approach to assessment leads faculty to focus more on compliance rather than seeking a better understanding of teaching and learning (Ariovich et al., 2019; Minelgaitė et al., 2019; Suskie, 2016).

Current higher education institutions allocate valuable resources to assessment activities (Jankowski et al., 2018). It is unclear, however, how these activities are perceived by students or how they influence student learning (Gerritsen-van Leeuwenkamp, 2019; Jones, 2020; Kaur, 2018). In the creative disciplines such as visual and performing arts, as well as art and design programs, assessment is particularly complex (Graham, 2019; Holmwood, 2019). Schools offering these kinds of programs continue to experience challenges in meeting accreditation requirements and assessing student achievement. These challenges are described in *Assessment on Our Own Terms*, published by the National Association of Schools of Art and Design (NASAD, 2009). This policy brief describes the frustration experienced by those teaching in creative disciplines who participate in assessment activities daily but see their assessment work as being diminished by external forces. Furthermore, Hoey and Ferguson (2015) discussed these complexities by presenting case studies from schools of art and design. They wrote, "assessment and quality assurance in creative disciplines is bound to be different both in theory and practice from other fields of this endeavor" (Hoey & Ferguson, p. 1).

Theoretical Context

Higher education institutions, according to some sources, would do well to focus more on the effect of assessment on teaching and learning and less on adhering to accreditation standards and compliance (Tavares, 2017). Some sources posit institutions should consider whether the process of assessing student learning is influencing the actual results (Gerritsen-van Leeuwenkamp et al.; Watering et al., 2008). The best juncture at which to start is with the students. Student and faculty perceptions of assessment vary based on their own experiences and goals (Kaur et al., 2017; Jones et al., 2020; Watering et al., 2008). Using multiple regression analysis, Gerritsen-van Leeuwenkamp et al. (2019) found a positive relationship between

students' perceptions of assessment and their learning results. Students' effects of assessment on learning "(F (1, 202) = 25.79, p < .001) explains 10.9% of the variance in the students' deep learning approach (adjusted R^2 = .109), b = /18, 95% CI [.11m, 25]" p. 77). On the contrary, Watering et al. (2008) found no significant relationship between student perceptions of assessment and their learning results. Applying a multivariate analysis of variance, Watering et al. found "significant differences among the three levels of preferences for written assessments on the assessment scores, Wilks's K = .95, F (4, 414) = 2,614, p < .05, though the multivariate effect size n^2 based on Wilks's Λ was low, at .03, suggesting the relationship between the preferences and the assessment scores are weak" (p. 654).

As the focus on assessment in higher education continues to increase, further research is needed to help improve assessment practices to ensure alignment with student learning (Gerritsen-van Leeuwenkamp et al., 2019). Of particular focus in this research is the perceptions of students enrolled in a game art program. A review of the literature found no specific research pertaining to Game Art students' perception of assessment. Thus, the aim of this study is to synthesize previous studies to develop an evaluation of the manner in which undergraduate game art students' perceptions of assessment in higher education potentially influences their achievement of learning outcomes. Ideally, this study will support the improvement of assessment practices in art and design colleges to better affect student learning.

Problem Statement

Research has found students' perception of assessment has been connected to a variety of factors including goal orientation, amount of assessment, control over the process, students' emotions and need for engagement (Kaur et al., 2017; Lynam, 2018). Researchers have begun to develop the influential nature of students' perception of assessment on their learning (Gerritsen-

van Leeuwenkamp et al., 2019: Jones et al., 2020: Kaur et al., 2017; Wass et al. 2020). Current literature underscores that students negatively respond to the process of assessment due to a lack of control (Jones et al., 2020). In creative disciplines such as game art, assessment is even more complex given the subjective nature of the student work as well as students' personal attachment to their art (Graham, 2019; Holmwood, 2019). Holmwood (2019) described the complexity of assessing art in higher education, addressing the emotional influence of assessment on students. This emotional influence can originate from the personal approach to creation resulting in students feeling personally criticized when their work is negatively assessed (Graham, 2019). Holmwood (2019) also emphasized the subjectivity of art assessment and the need for faculty to focus on the process in art assessment, not just the final product. Art students are often assessed via portfolio assessment (Graham, 2019; Zupančič, 2020). Portfolio assessment involves students submitting to faculty a portfolio of work for review. This process is often implemented to assess students midway through their curriculum with a goal of identifying areas of improvement in order to progress to higher level studio courses.

Students' perception, positive or negative, should not be ignored when developing and implementing assessment practices in higher education (Kaur et al., 2018). Gerritsen-van Leeuwenkamp et al. (2019) identified a need for further research on students' perception of assessment. This is particularly important as available literature does not address the effects of perception on achievement of learning outcomes specific to game art students (Graham, 2019). Therefore, the problem is that there exists little data on Game Art students' perception of assessment activities and its influence on their achievement of learning outcomes as evidenced in their advancement review portfolios. Thus, this research further addresses the existing body of

knowledge and helps to fill the gap in the literature specific to the relationship between perception of assessment and student learning as it pertains to game art students.

Purpose Statement

The purpose of this quantitative non-experimental predictive correlational study is to analyze the relationship between game art students' perceptions of the quality of assessment practices in higher education and their achievement of learning. The predictor variables for this study are perception of the following: *effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment* and *credibility of assessment*. The predictor variables address six factors identified in Gerritsen-van Leeuwenkamp et al.'s instrument (2019) Students' Perceptions of Assessment Quality Questionnaire (SPAQQ). Each of these factors is measured via specific questions inherent to the survey.

Gerritsen-van Leeuwenkamp's six factors impacting assessment are uniquely defined based on student's perceptions. The first factor, *effects of assessment on learning*, represents the effect of the assessment on student learning as measured via students' perception of whether the assessment produced a positive effect on their learning, was valuable, was motivating and confidence building and provided feedback to support learning. This factor comprises items such as self-regulation, feedback, and motivation (Gerritsen-van Leeuwenkamp et al., 2019). The second factor, *fairness of assessment*, signifies whether the requirements of the assessment are equitable and whether the assessment reflects the learning outcomes (Gerritsen-van Leeuwenkamp et al., 2019). The third factor, *conditions of assessment*, references situations that are outside of student control. This may include the format of the assessment or faculty competence in administering the assessment (Gerritsen-van Leeuwenkamp et al., 2019). The fourth factor, *interpretation of test scores*, is defined as how well the results of the assessment

measure the achievement of the learning outcomes (Gerritsen-van Leeuwenkamp et al., 2019). The fifth factor, *authenticity of assessment,* includes how well the assessment reflects the demands of the industry for which the students are preparing to work (Gerritsen-van Leeuwenkamp et al., 2019). The sixth factor, *credibility of assessment* is defined as the students' acceptance and faith in the assessment (Gerritsen-van Leeuwenkamp et al., 2019).

The criterion variable is *student achievement of outcomes*. Student achievement of outcomes is defined by students' actual scores received on advancement review portfolios as scored by faculty utilizing institutionally-approved rubrics. The population will include undergraduate game art students completing their advancement portfolio review assessment at a small art college in the Western region of the United States.

Significance of the Study

Conventional knowledge based assessment is no longer effective in higher education (Bryan & Clegg, 2019). Assessment in higher education traditionally focused on developing curriculum based on what educators want students to know and then testing students in order to determine their level of achievement of the knowledge and skills the educational program was designed to teach (Shavelson, 2007). Measurement of achievement was limited to multiple choice or fill-in-the-blank types of assessment designed to identify if students have gained knowledge. Research has found that the administration of this type of testing to measure achievement is not always effective as it relies heavily on memorization and does not measure students' actual ability (Ghosh et al., 2020). Traditional knowledge-based assessment has been behaviorist, or teacher-centered, designed to measure what the educator believes is important for students to know (Shavelson, 2007). This approach does not include student participation in any way; therefore, learning is solely dependent on the teaching, not on the actual student

construction of his or her own learning. Knowledge-based assessment is particularly problematic in assessment of creative disciplines which can be highly subjective (Graham, 2019; Hoey & Furguson, 2015). A more learner-centered approach to assessment can better measure what students are able to do.

Current assessment practices are gradually becoming more authentic and learner-centered, measuring students' ability to perform authentic tasks related to their career goals (Kahn et al., 2019). These skills and the knowledge acquired guide the development of the curriculum. Thus, the process starts with the identification of essential learning outcomes: what students will know and be able to do as a result of learning. Authentic assessment is focused on the *act* of achievement, not just on the accumulation of knowledge (Villarroel et al., 2018). Changes to assessment and the focus on accountability have resulted in much frustration among educators and students (Carson, 2019, Henderson et al., 2019; Medland, 2016; Mendez, 2020; Shavelson, 2016; Taveras, 2017; Wass, 2020). Assessment in creative disciplines such as art and design programs are also experiencing challenges pertaining to assessment (Graham, 2019; Hoey & Furguson, 2015). These challenges include trying to asses subjective work with an objective, prescriptive process (Graham, 2019). Also, the intimate nature of student work in creative disciplines can cause the assessment process to feel more personal for the student (Holmwood, 2019). Furthermore, assessment is already predominant in art and design programs thought critique, so mandating compliance with formal processes is often perceived as redundant and arbitrary to both students and faculty (Blythman et al., 2008; Orr & Bloxam, 2013).

Art educators have traditionally relied on the implementation of more authentic assessment through processes such as critique and portfolio review (Blythman et al., 2008; Graham, 2019; Orr & Bloxam, 2013; Zupančič, 2020). These assessment tools are administered

to measure the process of creation, not just the end result. Analyzing the process of creation is a critical component of art assessment as the analysis of the resulting artifact can be quite subjective (Holmwood, 2019). The employment of portfolio assessment in art is very common and allows faculty to review the level of improvement in technique and other factors adding to the creation process. However, these methods of assessments can be considered high-stakes, effecting the students' emotional well-being and overall achievement of outcomes (Gerritsen-van Leeuwenkamp, 2019; Kaur et al., 2018; Lynam, 2018; Wass, 2020)

This study is significant to better understanding game art students' perceptions of assessment via portfolio review. Because portfolio reviews are widely implemented to assess art students, it is important to understand the effects of this process on students (Graham, 2019; Scott, 2018). Research has identified a relationship between students' perception of assessment and achievement of learning outcomes (Gerritsen-van Leeuwenkamp, 2019; Kaur et al., 2018; Lynam, 2018; Preston et al., 2020; Serrano, 2018; Wass, 2020). Wass et al. (2020) designed a qualitative study to identify the emotional responses students experienced as a result of assessment in higher education. The study also sought to understand how students' perceptions of assessment influenced their learning experience and their emotional well-being. The research results included that 58% of participants experienced an emotional response to assessment. Of those, 87% experienced negative emotions in relation to assessment practices. Wass et al. (2020) also identified a relationship between fostering negative emotions towards assessment and the level of student learning in 75% of participants. Stress and personal and academic sacrifice were most identified as factors influencing students' emotional well-being and achievement of learning outcomes. Jones et al. (2020) posited that students' overall mental well-being can be greatly influenced by assessment practices but did not include information pertaining to how

student learning was affected. Furthermore, Kaur et al. (2018) described how the process of assessment facilitates learning and, therefore, can influence the achievement of outcomes.

Other research found a positive relationship between student perception of assessment and student learning. Gerritsen-van Leeuwenkamp et. al, (2019) found "students' perceptions of assessment quality have a significant positive relation with their learning outcomes for the assessments" (p. 63). This study, however, was limited to students from an applied science university and does not address assessment of creative disciplines such as game art. While Gerritsen-van Leeuwenkamp's (2019) study provided some evidence leading to a perception that instructors can essentially improve learning by improving the quality of the assessment practices, it is limited in scope. Further study is needed on the effect of assessment on art students, particularly through the administration of portfolio assessment for advancement to the next academic level.

Using Gerritsen-van Leeuwenkamp's study as a foundation, this research will focus solely on the assessment of game art students via portfolio assessment. The video game industry continues to expand and is estimated to be worth over $178 billion, an increase of 14.4% from 2019 (WePC, 2021). As a result, colleges are increasing access to such programs in order to prepare students for careers in this quickly expanding industry. The findings of this research can contribute to the body of knowledge pertaining to the effect of the perception of portfolio assessment on student achievement of game art students.

Research Question

The following research question guided this study:

RQ: How accurately can student achievement on their advancement review portfolio assessment be predicted by the linear combination of students' perception of *effects of*

assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment and *credibility of assessment* for undergraduate game art and design students at their midpoint assessment?

Definitions

1. *Advancement Portfolio Review* – the process of reviewing a portfolio of student work in order to advance art and design students to the next level in their degree program (Graham, 2019; LCAD Student Handbook, 2020).
2. *Assessment for Learning* – "part of everyday practice by students, teachers and peers, that seeks, reflects upon and responds to information from dialogue, demonstration, and observation in ways that enhance ongoing learning" (Klenowski, 2009, p. 264).
3. *Assessment in Higher Education* – the practice of measuring what students know or can do upon completion of their learning (Ewell, 2010).
4. *Authentic Assessment* – demonstrates students' skills and knowledge (Ashford-Rowe et al., 2014)
5. *Authenticity of Assessment* – "represents the alignment of testing and assessment with professional life, such as the similarity of testing conditions to the conditions students will encounter in their future jobs" (Gerritsen-van Leeuwenkamp et al., 2019, p. 13).
6. *Conditions of Assessment* – "contains circumstances that impact students but that they cannot control, such as test organisation, teacher professionalism, and test construction" (Gerritsen-van Leeuwenkamp et al., 2019, p. 13).
7. *Credibility of Assessment* – "the students' belief in assessment; it contains items about trust and involvement" (Gerritsen-van Leeuwenkamp et al., 2019, p. 13).

8. *Effects of Assessment on Learning* - "the influence of assessment on students' learning processes and their progress. It contains items, such as self-regulation, feedback, and motivation." (Gerritsen-van Leeuwenkamp et al., 2019, p. 13)
9. *Fairness of Assessment* – "refers to whether the requirements for successfully taking the assessment are reasonable and feasible; for example, the correspondence between the tests and the learning goals" (Gerritsen-van Leeuwenkamp et al., 2019, p. 13).
10. *Interpretation of Test Scores* – "the meaning of the students' test scores, such as whether or not the scores reflect the students' actual mastery of the subject" (Gerritsen-van Leeuwenkamp et al., 2019, p. 13).
11. *PDSA Cycle (Plan-Do-Study-Act)* – "a systematic process for gaining valuable learning and knowledge for the continual improvement of a product, process, or service" (Deming Institute, n.d.)

CHAPTER TWO: LITERATURE REVIEW

Overview

This chapter focuses on Boud's (2000) theory of sustainable assessment, Deming's (1986; 2000) theory of total quality management, Pearse's theoretical framework of three paradigms (1992) and Bloom's learning taxonomy (1956). These theories guided this research as well as a review of the literature pertaining to assessment in higher education. The objective of this literature review is to underscore the purpose, influence, and students' perception of assessment practices in higher education. It will also examine assessment in the field of game art education. The purpose of this study is to examine game art students' perceptions of assessment in relation to their learning. This literature review includes a theoretical framework, related literature, and summary.

Theoretical Framework

This research was guided by several established theories pertaining to the practice of assessment. Boud's (2000) theory of sustainable assessment and Deming's (1986; 2000) theory of total quality management align with current assessment practices in higher education. Pearse's theoretical framework of three paradigms related to thought and action (1992) is another theory guiding this research, especially related to art education. Finally, Bloom's learning taxonomy guides this study as it is easily applied to assessment of creative disciplines such as visual arts (Bloom et al. 1956). Bloom's taxonomy is applied in authentic assessment practices which is a critical component of this study.

Boud's Theory of Sustainable Assessment

Boud's (2000) theory of sustainable assessment indicates that assessment must be sustainable throughout life, not just during the education experience. Originating from the

concept of *sustainable development*, Boud (2000) described sustainable assessment as not only addressing students' current needs but also their future needs. Sustainable assessment is that in which students participate and learn. Boud's theory posits that assessment should involve the student and foster critical decision-making throughout their life (Boud, 2000). This theory advocates for a shift in assessment practices from teacher-centered, knowledge-based assessment, to learner-centered assessments where students participate in their own learning. Knowledge-based assessment focusses on measuring what students know as a result of their studies (Shavelson, 2007). This kind of assessment relies heavily on memorization. Learner-centered assessments focus on measuring what students are able to do, which relies more on the application of their learning.

Of particular importance in Boud's theory is formative assessment which assesses students early in their learning with a goal of providing input to help students reflect on their progress and establish goals for further improvement (Clark, 2012). Boud described a continued dependence on summative assessment in higher education which involves assessing students at the end of the academic programs to measure achievement of learning outcomes (Boud, 2000). While summative assessment can demonstrate areas where curriculum might be enhanced to improve learning, it is often completed at the end of the students' academic journey; this means the student may not benefit during their learning journey (Clark, 2012; Suskie, 2018). Conversely, formative assessment provides feedback during the process of learning so students can attend to their areas of weakness while they are still learning. Formative assessment provides students with feedback at a time when they really need it to enhance their studies (Black & Williams, 1998; Clark, 2012; Suskie, 2018).

Boud emphasized the need for assessment practices that include students in the process early in their education, thus inspiring lifelong, participative learning. Boud's theory of sustainable assessment addresses a need for higher education to ensure assessment is applicable to students' lives and their experiences. This theory continues to guide scholars in the area of assessment (Morell, 2021; Nguyen, 2016; Wu, 2021). As an example, Morell's (2021) quantitative study of assessment and student learning, based on Boud's theory of sustainability, discovered a connection between assessment feedback and student achievement. Students who relied on feedback increased their assessment scores from a mean of 58.6% to 64% on their final submissions.

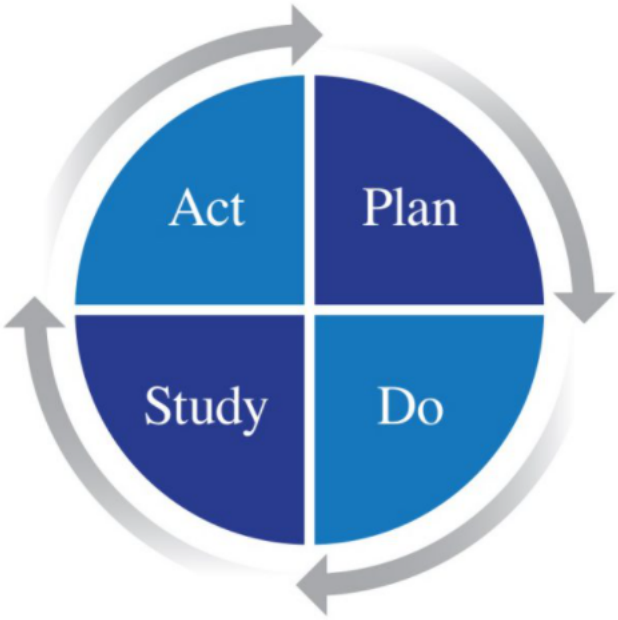
Deming's Theory of Total Quality Improvement

Deming's theory of quality improvement also applies to higher education assessment (Holt, 1993; Kanwar et al., 2019; Lohr, 2015; Redmond, et al., 2008; Stensaasen, 1995; Suskie 2018). In 1950, an engineer, William Edwards Deming, was hired as a consultant to teach Japanese car manufacturers how to improve their production cycle. Deming's work led to such high-quality cars and automotive products that he effectively saved the Japanese industry from ruin after World War II (Deming, 1986; 2000). His work was instrumental in improving the quality of products in the automotive industry in the 20th century. Soon after, American automotive manufacturers sought his help as well. Deming's theory of quality improvement originated in manufacturing and involved a cycle of planning, doing, checking and acting focused on continuous quality improvement with an end result of increased productivity and high-quality products. During this era, Deming essentially shifted the focus of business and manufacturing from mass production to creation of high-quality products.

This emphasis on quality was not limited to just the end product but included the entire production process. Deming's theory supports the need for increased quality in each stage of production, including the following: planning (collecting data), doing (building of product), studying (assessing quality) and acting (implementing results of assessment). The planning stage involves collecting data and strategizing the best way to create the product. The doing stage is the act of production or the process of creating or building the product. The study stage is where the assessment of quality occurs by administering an identified measurement tool. Finally, the acting stage is when that which is learned in the other three stages is implemented to improve the product. The cycle (Figure 1) is meant to repeat so quality improvement is continuous, thus closing the loop.

Figure 1

Deming's PDSA Cycle



Note. From The Deming Institute, PDSA Cycle, n.d. (https://deming.org/explore/pdsa/)

While initially focused on business, Deming's theory of quality has been adopted by educators and can be applied to the process of assessment of student learning in higher education (Holt, 1993; Kanwar et al. 2019; Lohr, 2015; Moen, 2010; Montano, 2005; Redmond, 2008; Stensaasen, 1995; Suskie 2018). As a result of this cycle of continuous quality improvement, Deming became known for his visionary teachings on total quality management (Holt, 1993; Redmond, 2008). Deming's theory posits that quality, cost, and production are all aligned and can be continuously improved by focusing on the entire system of production. Montano et al. (2005) applied Deming's PDSA cycle to measure improvement of student advising at a Texas university. This case study demonstrates an example of the application of Deming's theory to higher education. The case study incorporated brain storming and flowcharting to better understand the advising process. Areas for improvement were compiled based on feedback from staff questionnaires and student focus groups. Finally, a survey was administered to (N=91) students to collect data pertaining to satisfaction and collecting valuable information to be implemented for improvement. This study identified 37% of the students were extremely satisfied and only 7% were not satisfied. The open-ended questions enabled the researcher to identify specific areas for improvement such as wait time, location of services, and assignment of advisors to the same student. As a result of this study, the advising center staff were able to implement real enhancements based on data collected via application of Deming's PDSA cycle to improve the overall quality of their advising services (Montano et al., 2005).

Deming's theory supports the process of continuous learning with a focus on the whole organization and a collaboration of the individuals who comprise that organization. This concept aligns with Boud's (2000) theory of sustainable assessment. Both Boud's and Deming's theories

emphasized improvement with a student-centered focus. These theories are bridged by Pearse's theory of three paradigms.

Pearse's Theory of Three Paradigms

Bridging Deming's and Boud's theories, Pearse's theory of three paradigms related to thought and action provided the content-specific focus on assessment in art education (Pearse, 1992). Pearse revisits Habermas' (1971) three paradigms for understanding theory and practice in education and applies this theoretical framework to art education. The three paradigms foundational to Pearse's theory include the *Empirical-Analytic* orientation regarding work; the *Interpretive-Hermeneutic* orientation pertaining to communication; and the *Critical-Theoretic* orientation encompassing reflection (Pearse, 1992). Pearse examined art education from the perspective of human behavior and the process of learning, describing art education per each paradigm. Like Boud, Pearse focused on the students and their role in the process of assessment. Not only does Pearse's work recognize the complexity of assessment in the arts, but it also supports the implementation of portfolios to assess the creative process.

Art education faculty experience challenges related to appropriate assessment because they want to examine the entire process of making and creating, not just the final product (Holmwood 2019; Pearse, 1992). This practice does not comport with traditional, knowledge-based assessment practices which were designed to assess final work products. Alternatively, faculty in creative disciplines, such as game art, focus their assessments on the process of learning by reviewing portfolios of student work designed to demonstrate progress in artistic development (Hope & Wait, 2013). Applying portfolio reviews for assessment aligns with "best practices of assessment" as described by Driscoll and Wood (2011). Driscoll and Wood stressed the importance of applying assessment practices that engage the learner in a more meaningful

way and focus on the process of learning rather than the outcome or end product. Formative assessment best performs this function by providing students the information they need to continue to improve while they have the opportunity to incorporate the feedback rather than post-product.

This concept, while relatively new in higher education assessment, is the foundation of portfolio review for creative disciplines such as game art. Pearse's theory of three paradigms expanded his previous work (Pearse, 1983) which was completed prior to developments in art education connecting social, political and cultural issues with the creation of art. Pearse described these developments as contributing greatly to the enrichment of art education especially as a reflection of contemporary art. This understanding of how developments in society influence art education enhanced Pearse's theory of three paradigms.

Bloom's Theory of Learning Taxonomy

Bloom's taxonomy and subsequent work built a framework for higher education research specific to the assessment of visual learning in creative disciplines. In the mid-1950's, as part of a study to create standardized tests, Bloom et al. (1956) distinguished between lower-level and higher-level thinking and learning. Bloom's theory of learning taxonomy was comprised of the following three domains of learning: cognitive, affective, and psychomotor (Bloom et al., 1956). These domains were based on multiple stages of learning. Later in the mid-1990's, Bloom's theory was revised by one of his students to establish a hierarchical matrix of verbs demonstrating the process of learning (Krathwohl, 2002). This matrix included six domains of learning: creating, evaluating, analyzing, applying, understanding and remembering. Creating is at the highest level of learning with remembering at the lowest level. Creating is measured through student work products demonstrating what students know and can do, while

remembering is knowledge-based and often includes methods for measuring via standardized tests which rely mostly on memorization skills.

Bloom's six domains continue to be foundational to the assessment of student learning (Krathwohl, 2002). Assessment begins with clearly-stated and measurable outcomes (Scott, 2018; Suskie, 2018). Therefore, Bloom's taxonomy is applied in education as a guide for writing measurable learning outcomes reflecting multiple levels of learning across the curriculum (Chandio et al., 2016). An example of this is presented in Arneson and Offerdahl's (2018) study which applied Bloom's taxonomy to create a visual learning tool for undergraduate biology students. The tool was created to include both the *application* and the *implementing* cognitive processes. The tool was tested by five faculty assessing students in an undergraduate introductory biology course ($N = 76$). Inter-rater reliability was very good, indicating the tool was effective ($K = 0.86$). This tool can now be administered by instructors and students to assess and enhance learning. This study demonstrated the applicability of Bloom's taxonomy for assessment, applying a tool specifically designed encompassing Bloom's domains to assess visual learning (Arneson & Offerdahl, 2018).

Mnguni et al. (2016) implemented Bloom's taxonomy as a basis for measuring undergraduate students' visual literacy. Mnguni posited that the learning of biochemistry is highly dependent on visual learning such as through diagrams, graphs, and animations. This study sought to determine the cognitive skills necessary for visual learners such as biochemists and to develop an assessment tool to measure these skills. The tool was also tested for reliability with students from two different university campuses ($N = 106$). Results included reliability coefficients ($r = 0.93$; $r = 0.96$) from both campuses indicating the tool is reliable (Mnguni, 2016). These studies not only demonstrate the viability of Bloom's taxonomy as a framework for

higher education research, but they also support the application of Bloom's domains specific to the evaluation of visual learning such as is accomplished through portfolio review in creative disciplines such as game art.

The theoretical frameworks of Boud (2000), Deming (1986, 2000), Bloom (1956), and Pearse (1992) provide the context for this research. Boud's theory of sustainable assessment, or assessment for life, aligns well with Deming's theory. Both theories are grounded in the concept of continuous quality improvement. Similarly, Pearse's theory provides a framework for continuous improvement, but is specific to art education. Pearse, like Boud emphasizes the need for assessment to be continuous, using formative assessment practices as the starting point. Finally, Bloom provides clear guidelines for assessment across curriculum via measurable outcomes expressly related to evaluation of creative works such as art for video games.

Existing literature related to assessment demonstrates the importance and the need for studying the relationship between students' perception of assessment and their learning, specifically in game art education (Cox et al., 2017; Medland, 2016; Melguizo and Coates, 2017; Minelgaitė et al., 2019; Pavlenko, 2020; Rhodes, 2016; Serrano et al., 2018; Shavelson, et al., 2016; Zlatkin-Troitschanskaia et. al., 2018). The need for further study in the area of assessment in art education is particularly important because of the unique nature of evaluating the arts, as in Pearse and as pertaining to assessing the process of creation instead of the end product, as in Boud and Deming. This research will support sustainable assessment as in Boud at the highest echelons of the evaluative experience as in Bloom. This sustainable assessment is even more critical to art education given the importance of continuous assessment as artists continue to improve and create beyond their formal education.

Related Literature

Research pertaining to assessment is not new to higher education. There have been many studies supporting this topic in recent years (Cox et al., 2017; Medland, 2016; Melguizo and Coates, 2017; Minelgaitė et al., 2019; Pavlenko, 2020; Rhodes, 2016; Serrano et al., 2018; Shavelson, et al., 2016; Zlatkin-Troitschanskaia et. al., 2018). Many of the studies focused on assessment for quality assurance (Amodt et al., 2018; Brumwell & MacFarlane, 2017; Tavares et al., 2017; Young, 2018). Other studies focused on the effects of assessment (Jones et al., 2020; Kaur et al., 2018; Minelgaitė, 2019). Still other research focused on the barriers to assessment (Henderson et al., 2019; Medland, 2016; Shavelson, 2016; Wass, 2020; Zlatkin-Troitschanskaia et. al., 2018). Other research is specific to assessment in the arts (Graham, 2019, Holmwood, 2019). The review of the literature begins with assessment practices in higher education, followed by assessment in the visual arts, reasons for assessment, barriers to assessment, perceptions of assessment, and finally a description of the foundational study from which this study is developed, including the pertinence of game art study.

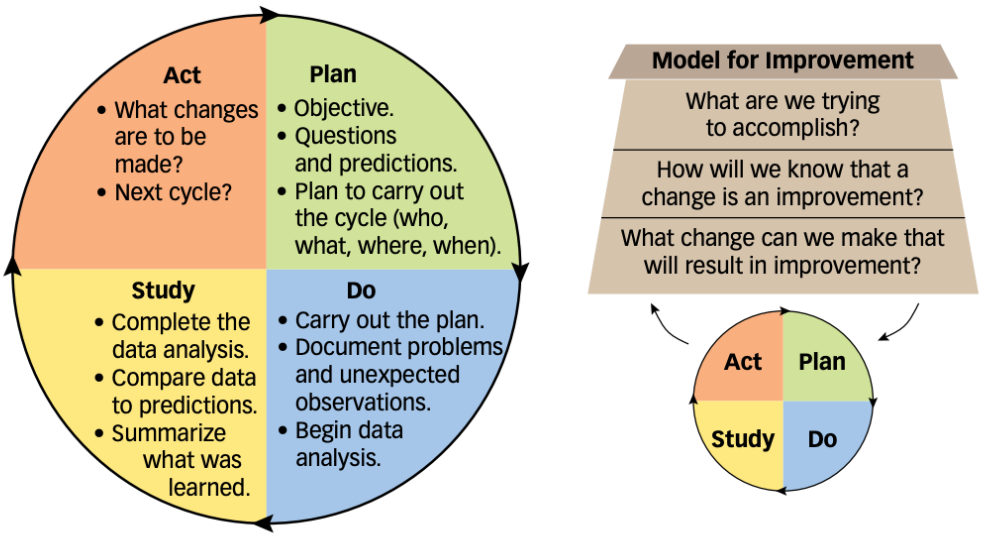
Assessment Practices in Higher Education

Assessment in higher education involves measuring what students know and can do as a result of teaching and learning (Amodt, 2018; Ashford-Rowe et al.; 2014 Brumwell et al., 2017; Preston et al., 2020; Rhodes, 2016; Rust, 2016). The purpose of assessment of student learning is to collect evidence to support continuous improvement of curriculum and teaching and learning (Suskie, 2018). Assessment results can apprise educators of the effectiveness of teaching as it relates to student success (Bolat and Karakus, 2017; Suskie, 2018).

Assessment in education is based on a circular model like Deming's original Plan, Do, Check, Act (PDCA) cycle of quality improvement (Deming, 1986; 2000). Deming's cycle has

since evolved for application in higher education. In 1986, the PDSA cycle was revised by replacing the "check" step with "study" to encourage progress versus restraint as was assumed by the term "check" which is a more punitive concept (Moen, 2010). Then, in 1993, the cycle was refined even more to address the intricacies of quality improvement as shown below.

Figure 2
PDSA Cycle and Model for Improvement—1991, 1994

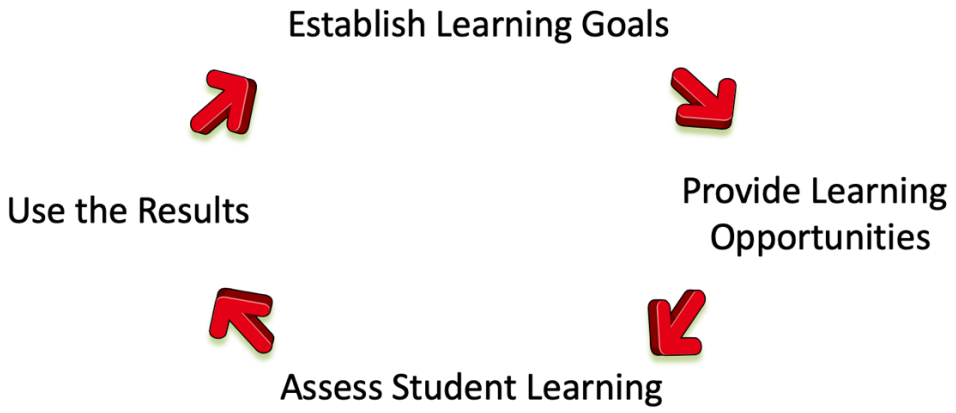


Note. Model for improvement. From "Circling Back," R. Moen and C. Norman, 2010, *Quality Progress 43*(11)2, p. 27.

In modern higher education, the PDSA model has been adapted as a process to assess teaching and learning as depicted in Suskie's (2018) four step cycle.

Figure 3

Suskie's Teaching, Learning, and Assessment as a Continuous Four Step Cycle



Note: From *Assessing student learning: A common sense guide* (3rd ed., p. 9), by L. Suskie, 2018, Jossey-Bass.

Faculty in higher education begin the assessment cycle with the planning stage in which they identify or create measurable learning outcomes (Bryan and Clegg, 2019). The next rotation in the cycle is the delivery of curriculum, services, programs or opportunities. During this rotation, teaching and learning occur. This rotation parallels Deming's "do" step. Next, student work products, often described as artifacts, are evaluated to measure achievement of the learning outcomes. This is the "study" rotation in Deming's cycle. Finally, curriculum and teaching practices are revised and reinforced to improve the measured levels of achievement of learning outcomes. During this rotation, similar to Deming's "act," new innovations and methodologies are considered by faculty based on the data collected in the previous rotation. This four-rotation cycle is meant to repeat in an effort to continuously improve teaching and learning in higher education.

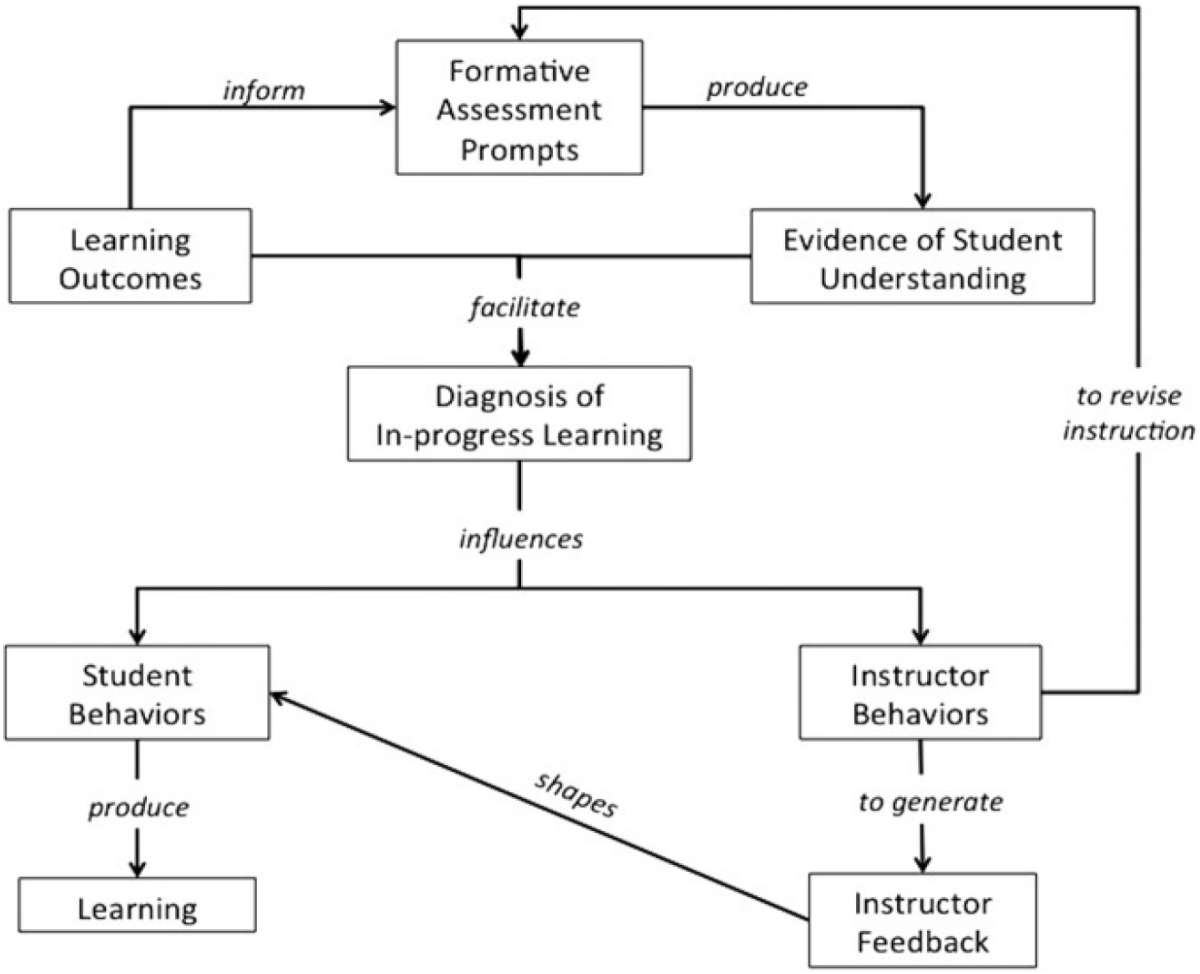
In rotation *one* of Suskie's (2018) assessment cycle goals or outcomes are developed to describe the intended purpose of what students will know and be able to do as a result of learning. These outcomes may represent what students will learn in an entire program or in a singular course. Bloom's taxonomy is commonly applied to describe these learning outcomes at different cognitive domain levels (Chandio et al., 2016). For example, an outcome for a fine arts student may include *students will be able to demonstrate applied perspective to achieve the illusion of depth*. An outcome for a game art program might include *students will be able to apply color theory effectively to composition and hierarchy of navigation through art or game space.*

Formative assessments measure student performance early in their education or even before they begin their studies (Clark, 2012; Arneson and Offerdahl, 2018; Suskie, 2018). Collecting formative assessment data allows educators to understand students' skill acquisition as it occurs and identify specific content on which to focus their teaching to improve students' comprehension. Clark (2012) described formative assessment as a practice which supports learning by sharing assessment results by design. The practice of formative assessment assumed greater meaning in the early 1990s when reports, such as developed by the Assessment Reform Group (ARG, 1999), introduced a need for faculty to apply assessment results to adapt their teaching, students to participate in their own learning, feedback as needed to support learning, and self-assessment contributing to student improvement. In modern higher education, the practice of formative assessment involves the collection of evidence of student learning implemented to create feedback applied by both the faculty and the student for continuous improvement of achievement in the desired learning outcomes (Arneson and Offerdahl, 2018). The practice of formative assessment is specifically designed with a team approach in which the

student and the faculty participate in a conversation about strengths and weaknesses in relationship to the students' achievement. The process is reflective and interactive, giving the student a sense of agency in his or her own learning. Prompts or questions are designed to provide opportunities for reflection and dialogue. Figure 4 depicts the formative assessment process.

Figure 4

Clark's Iterative Formative Assessment Process



Note. From *Formative assessment: A systematic and artistic process of instruction for*

supporting school and lifelong learning (p. 4) by Clark 2012.

Formative assessments can be valuable in curriculum development as it highlights the skill acquisition of incoming students. This type of assessment data is also useful in advising students pertaining to where they need to focus their attention for improvement. For students, formative assessment can provide an opportunity for reflection and establishing goals, guiding them towards improving their achievement of learning outcomes throughout their studies. When students engage in this process through evaluating and incorporating faculty feedback, they are able to improve via self-assessment and reflection as they continue to learn even beyond college (Boud, 2000).

Black and Wiliam (1998) described a direct connection between formative assessment practices and student learning. Their review of over 20 research studies pertaining to the practice of formative assessment resulted in quantitative evidence of significant improvement of learning resulting from innovations in the process of formative assessment. Learning gains were measured by comparing improvements in test scores of students who participated in formative assessment, resulting in correlations ($r = 0.4$ to $r = 0.7$) between the formative assessment studies. These were larger than those of students who did not participate in formative assessment (Black & Wiliam, 1998). On the contrary, they discovered traditional knowledge-based assessment emphasizes the function of grading as opposed to the providing of feedback that supports learning. This research supports the need for assessment practices that measure what students can do.

Summative assessment practices include the process of measuring students' full scope of learning and is often conducted at the end of their studies (Clark, 2012). Data collected during this type of assessment can be particularly beneficial for demonstrating overall student

achievement and educational effectiveness of a program of study. Summative assessment data are often implemented in accreditation reports and program reviews to highlight what graduates can do as a result of an entire academic program or course. Summative assessments provide evidence necessary to establish standards of performance and to improve overall student learning (Nieminen & Tuohilampi, 2020). The results are applied to both the students' improvement of learning and the improvement of the academic program or the entire institution. While summative assessments provide important data for higher education administrators, formative assessment supports student learning because feedback is provided at a time when it can be implemented by the student rather than diagnostically (Granberg et al., 2021; Kyaruzi et al., 2019). Formative assessment allows for more student involvement because it is completed throughout the process of learning and includes the student in the conversation as illustrated in Figure 4. On the contrary, summative assessment is more teacher-centric because it does not allow for student participation in the process. Students receive the results at the end of their studies when the learning is already completed as a means for diagnostic evaluation of learning (Clark, 2012).

Assessment of student learning may include the collection of quantitative and qualitative data via a variety of tools such as exam scores or scores on student work products (Kahn et al., 2019; Suskie, 2018). Quantitative data are represented via numbers and can be applied to measuring changes in achievement through statistical analysis of aggregated data on broad samples of data. This kind of data is typical in knowledge-based assessment and incorporates grades on exams, assessment scores on student work, or other numerical data. Implementing instruments that consist of quantitative data measures for assessment allow faculty to ascertain overall rates of achievement. However, student data are often aggregated, and identifiers are

redacted. Therefore, this type of assessment does not always allow for analyzing the individual student's learning. Qualitative data provide insight into more explanatory considerations associated with the breadth and depth of the student learning often via written narratives, observation, journaling, artistic expression, and interviews. Examples of this kind of data include focus groups, transcripts of meetings, discussions, art, music performance, and written feedback. Qualitative data can provide opportunities for engaging students in the process of assessment and can capture students' perceptions in relationship to their learning and the assessment process. Quantitative data can be applied in both formative and summative assessments.

Faculty can administer direct or indirect instruments to collect data. Direct assessment instruments measure learning directly (Suskie, 2018). For instance, if a student completes a task or problem, faculty can obtain direct evidence of the students' achievement of learning outcomes through scoring actual student work. Direct assessment may include standardized tests, course examinations and quizzes, signature assignments, advancement review portfolios, senior portfolios, thesis or capstone projects, or in the visual arts, films or video games as assessed via rubrics. Indirect assessment instruments measure students' perceptions regarding their learning (Suskie, 2018). This type of evidence is often self-reported in the form of opinions; therefore, it can be biased. Indirect instruments may include measures such as narratives from focus groups, course or program evaluations, and faculty and student survey results (Suskie, 2018). While both direct and indirect evidence of learning can serve a purpose in assessment, direct evidence is more compelling and tangible where indirect evidence is not always substantive (Suskie, 2018). Indirect assessment can be administered to complement direct assessment, in cases where data are needed expeditiously, or when outcomes are difficult to measure directly. For instance, if

measuring perceptions or opinions about students' achievement of outcomes, indirect assessment may be the best choice.

Embedded assessments are also included as an instrument type for measuring student achievement. This type of assessment includes assignments which are already included in the course work (Cummings et al., 2008). Embedded assessments can be administered for individual assessment or program-level assessment. They are intended to measure student performance and often include tasks designed to measure what students can do rather than what they can recall. Embedded assessments can include portfolios, performances, essays, speeches, or other tasks that can measure student competencies. This practice allows faculty to evaluate how well students can apply what they have learned as opposed to simply remembering information. For example, Kim (2016) administered both direct and indirect embedded assessment to evaluate achievement of program outcomes for graduate level nursing students. These embedded assessments resulted in achievement at a rate of 70% or higher. This study demonstrated how the administration of a measurable assessment process can validate achievement of learning and improve student learning. The administration of embedded assessment strategies such as this is an example of authentic assessment, measuring higher level cognitive skills and the performance of students.

Authentic Assessment

The shift from knowledge-based assessment via tests as an instrument to measure learner-centered assessment via student work products has affected assessment in higher education resulting in the application of more authentic assessment practices (Ashford-Rowe et al., 2014; Schultz et al., 2021). Authentic assessments measure knowledge and skills reflecting what students know and can do as a result of their learning (Ashford-Rowe et al., 2014; Bolat, 2017;

Schultz et al., 2021; Sotiriadou et al., 2020; Villarroel et al., 2018). Schultz et al. (2021) found both students and faculty identified performance-based assessments, including realistic and transferable skills to be authentic (N = 199 students and N = 39 faculty). This type of assessment is becoming more generally accepted as a more sustainable and effective approach to assessment (Bryan & Clegg, 2019). The practice of authentic assessment aligns with Boud's and Deming's theoretical frameworks because it is sustainable. Such an approach is ongoing and meant to be incorporated by the learner throughout his or her education and beyond. It is designed to be repeated to evoke continuous quality improvement and learning (Ashford-Rowe et al., 2014; Bolat, 2017; Schultz et al., 2021; Sotiriadou et al., 2020; Villarroel et al., 2018). Authentic assessment also incorporates Bloom's taxonomy in terms of identifying measurable outcomes reflecting what students know or can do as a result of their education (Arneson and Offerdahl, 2018; Mnguni et al., 2016).

Authentic assessment focuses less on what is remembered, more on the process of learning, and more on measuring improvement of that process through embedded assessments. When assessment is authentic, it systematically demonstrates or depicts what students can do (Ashford-Rowe et al., 2014; Bolat, 2017; Schultz et al., 2021; Sotiriadou et al., 2020; Villarroel et al., 2018). This type of assessment situates the learner in the center of the process, acknowledging his or her diverse experiences and background, and allowing him or her to engage in the process through reflection and applying faculty feedback. Ashford-Rowe et al. (2014) identified eight characteristics of authentic assessment. These include challenge, performance or product (outcome), transfer of knowledge, metacognition, accuracy, fidelity, discussion, and collaboration. Ashford-Rowe et al. (2014) found qualitative summaries of

student feedback through a review of literature related to authentic assessment supporting students respond well to authentic assessment.

Kahn et al. (2019) described authentic assessment practices, such as the administration of embedded assignments and portfolios of student work, as allowing for a deeper understanding of student achievement at higher cognitive levels. Authentic assessment which incorporates embedded assessment includes work precisely designed to be completed within a course in order to assess a specific learning outcome. Embedded assessments are integrated within the course materials and classroom activities or assignments rather than outside of the classroom experience, thus further engaging the student in the process.

Authentic assessments are uniquely designed to more effectively measure higher-order thinking skills (Bloom, 1956) and can often duplicate tasks and experiences one would experience in life situations (Ashford-Rowe et al., 2014; Guzzomi et al., 2017; Kahn et al., 2019; Schultz et al., 2021). Authentic assessment engages the learner in the process by facilitating the provision of detailed and immediate feedback on his or her work. This can be, and often is, performed via student work portfolios or more commonly implemented in modern higher education, ePortfolios. Segers (2008) described portfolios as student work that reveals the achievement of student learning and success which depicts, in detail, their stages of development. This form of authentic assessment is widely employed in the visual arts as an opportunity to allow for students to not only be assessed on a final product but to also assess their own progress. Reflection on the stages of their development is critical to student achievement in the field of visual arts as it allows students to truly understand their strengths and weaknesses and to apply this understanding to improve (Graham, 2019; Scott, 2018; Zupančič, 2020). Eisner (2002) stated “to succeed the artist needs to see, that is, to experience the

qualitative relationships that emerge in his or her work and to make judgements about them" (p. 9). This statement epitomizes the importance and process of authentic assessment.

The implementation of ePortfolios requires the digital submission of student work (Stevens, 2013). Due to the ease of submission and current availability and application of electronics in visual arts beginning in the 21st century, ePortfolios have increased in availability for assessment in the arts (Yancey, 2009). The American Association of Colleges and Universities considers the application of ePortfolio as a highly effective practice (Lilly and Cooper, 2021). This is especially true in digital arts programs such as game art which will be the focus of this research.

Authentic assessment often incorporates rubrics specifically designed by faculty to measure achievement of learning outcomes. In 2009, the Association of American Colleges & Universities (AAC&U) collaborated with faculty across the country to create VALUE (Valid Assessment of Learning in Undergraduate Education) rubrics to help colleges and universities apply authentic assessment practices to assess student learning across multiple disciplines and institutions. These rubrics defined the measurement strategies for determining the quality of outcomes and provided clearly-defined standards of achievement or performance. Outcomes are disaggregated into multiple dimensions, each with clear descriptors of standards of performance. VALUE rubrics are widely implemented by thousands of higher education institutions and are considered critical components of systematic authentic assessment practices.

Assessment for Learning (AfL)

Another example of effective assessment is the pedagogy modernization of assessment for learning (AfL). The role of assessment in education is to measure the achievement of learning outcomes for the purpose of improvement of teaching and learning (Ewell, 2010). However,

there is a difference between assessment *for* learning and assessment *of* learning. Assessment of learning aligns more with traditional knowledge-based methods of assessment in which faculty measure learning through the awarding of grades on exams. This type of assessment does not inform students of ways they can improve their learning; instead, it fosters competitiveness and superficial learning for the purpose of scoring high rather than measuring authentic learning (Black & Wiliam, 1998). Assessment *of* learning measures what the teacher presents rather than what the student learns. Conversely, assessment *for* learning (AfL) recognizes the function of students in their own learning (Klenowski, 2009; Wu et al., 2021).

AfL is an innovation that applies assessment practices in a way that engages learners in the process of assessment as well as in their own learning (Assessment Reform Group, 2002). Wu et al. (2021) posited student engagement in their own learning supports achievement of learning outcomes. AfL aligns well with Boud's theory of sustainable assessment because it fosters student engagement in the process of assessment and allows students to develop skills that may be applied beyond their formal education for lifelong learning. AfL also aligns with Bloom's taxonomy because it identifies achievement of specific cognitive levels. This is especially important in art education which is typically assessed at the higher cognitive level.

The influence of assessment on student learning can be experienced in a variety of ways. Research shows assessment not only measures learning, but it can also influence learning (Gerritsen-van Leeuwenkamp et al.; 2019; Lynam, 2018; Preston et al., 2020; Serrano, 2018). Specifically, the type of assessment may influence whether students engage in a deep or surface approach to learning (Boud, 2000; Gerritsen-van Leeuwenkamp, 2019; Kaur et al., 2018; Lynam, 2018; Wass, 2020; Wu et al., 2021). Lynam (2018) described the process of deep learning as facilitating learning through a more permanent understanding of the knowledge. Surface learning

is described as more superficial, pertaining mostly to memorization and recollection of facts (p. 223). Formative authentic assessment and assessment for learning have demonstrated a positive influence on students' deep approach to learning. On the other hand, summative knowledge-based tests administered for assessment may result in a surface approach to learning such as those identified in Bloom's *remembering* and *understanding* cognitive domain levels as opposed to the higher levels of *evaluating* and *creating* (Lynam, 2018).

The students' experience in the process of assessment can also affect their learning (Kahn et al., 2019). Lynam's (2018) qualitative study of 43 students identified that participants valued opportunities to engage in authentic assessments which measured authentic experiences rather than merely memorized facts. Students' experiences with assessment may also include receiving feedback which can be incorporated into their work and initiate opportunities for reflection on what they have learned (Alekseeva, 2018; Andrade, 2014; Kahn et al., 2019; Lynam, 2018). Conversely, negative assessment experiences might include those that evoke emotions such as fear and anxiety, assessment without substantive feedback, and assessments that are not considered beneficial to the student (Kaur et al., 2018).

The process of assessment and the achievement of learning are intrinsically connected. In alignment with Boud's theory, learning originates from the experience of the student. Therefore, the student must be intricately involved in the assessment process in order to learn from it (Nieminen & Tuohilampi, 2020). Brumwell et al. (2017) described the need for alignment of outcomes, experiences, and assessment processes in order to affect improvements in teaching and learning. Gerritsen-van Leeuwenkamp et al. (2019) described a direct relationship between students' perception of assessment and learning, supporting a need for authentic, learner-centered assessment to support learning. This study implemented multiple regression to analyze

students' perception of assessment quality and their learning and found a positive relationship (N = 192; adjusted R^2 = .051). Given this relationship, the process of teaching and learning must be considered in developing assessment practices (Amodt, 2018; Brumwell et al., 2017; Preston et al., 2020; Rhodes, 2016; Rust, 2016). Boud (2000) further supported the need for educators to consider learning and assessment beyond just course goals and grades. Wanner and Palmer (2018) described the need for assessment practices to be more flexible and inclusive, encouraging students to participate in their own learning. Their two-year study of undergraduate students (N = 154) did not result in evidence of improved outcomes as a result of authentic assessment practices. However, thematic analysis of open-ended questions on surveys indicated a 21% positive reaction from students as it pertains to engaging with the material (Wanner & Palmer, 2018). This study concluded that students could benefit from being included in the assessment process by applying formative self- or peer-assessments where application of feedback and reflection help support the process of learning. Their findings advocated for more active assessment practices that include the learner in the process, thus supporting teaching and learning.

Assessment in Visual Arts

Visual art products in higher education can be difficult to assess because of their subjective nature (Graham, 2019). Visual arts include arts that can be seen such as paintings, sculptures, drawing, filmmaking, and graphics (Unbound, n.d). This genre of art is created to evoke emotion or meaning. With the advent of technology such as the computer, visual art also includes video game art and design (Romero, 2016). The practice of formative assessment is common in visual art education and originated in the Renaissance era in the form of artistic criticism in competitions for architecture designs (Elkins, 2001). In modern education, the

application of studio critique in art education, or “crits,” is a widely implemented practice (Blythman et al., 2008; Orr & Bloxam, 2013). These crits involve public faculty and peer review of student work. Crits provide an opportunity for faculty to assess student work and offer feedback on performance for improvement and to underscore that which is working well (Blythman et al., 2008; Orr & Bloxam, 2013). Blythman et al. (2008) described crits as both formative and summative occasions for discussion and feedback. This feedback is typically verbal as the faculty and class members review work and listen to the artist describe his or her work as well as intent or artistic purpose. This process aligns with Boud’s (2000) theory of sustainability as art students are challenged to reflect on their work throughout the creative process and then continually improve their work thus aligning with Deming’s (1986) theory of quality improvement and Pearce’s (1992) theory of the role of students in assessment.

Art assessments are authentic because they require consideration of the process of learning and not just the outcome (Brewer, 2008; Graham, 2019; Holmwood, 2019). Despite this rich history, knowledge-based assessment in art education has been met with much educator cynicism (Graham, 2019, Holmwood, 2019). This skepticism is perhaps a result of art faculty’s rejection of traditional assessment techniques which are mostly objective, often inclusive of a quantitative system designed to measure knowledge-based outcomes such as traditional tests. This kind of knowledge-based assessment does not translate well in the assessment of creativity (Bloom, 1956). Therefore, art faculty are challenged with trying to measure creativity with traditional assessment techniques. While the use of crits is a good example of authentic assessment, the practice is not generally standardized, and, therefore, does not often allow for the collection of data for measuring and reporting student achievement.

Artistic evaluation is multifaceted due to the many factors that influence creativity such as students' artistic choices as well as their personal backgrounds, experiences, and emotions. Graham (2019) described art assessment as simplifying creativity which is often very complex. Furthermore, Holmwood (2019) described the challenge of being objective in the process of art assessment, adding to the complexity of traditional assessment. The process of artistic creation is complex and are, therefore, difficult to measure quantitatively. Hope and Wait (2013) described the nature of creating and that the individual choices comprising the process of assessment cannot focus solely on the outcome but must consider the artists' intent. For example, if the intent of the art is to convey a story, the outcomes would be very different than if the intent was to evoke an emotion.

Art faculty also encounter challenges when measuring outcomes originating from a single piece of work because creativity is a process that is never truly complete. Therefore, it is the process that must be assessed, not the result (Graham, 2019). Hope and Wait (2013) explained that there is not always a direct relationship between artistic skills and creativity. Thus, technical skills cannot be the sole factor in artist assessment. The entire process of creation inclusive of the artists' intent, his or her goals, techniques, and methods must all be considered in assessing achievement of student learning outcomes (Graham, 2019; Holmwood, 2019; Hope & Wait, 2013). This poses a definite challenge for art educators and their students because standardized assessment practices have been traditionally designed from quantitative, knowledge-based measures to collect data on achievement.

The learning outcomes for art education are typically encompassing of the higher cognitive domains of Bloom's taxonomy, thus requiring higher-level learning attributes such as analysis, synthesis, and evaluation (Krathwohl, 2002). These outcomes are difficult to measure

quantitatively. To address these challenges, portfolios of student work are employed by faculty to assess achievement of student learning outcomes by evaluating the entire process of creation. This practice is not new in art education. Zupančič (2020) described the implementation of portfolios for assessing student learning as originating with arts education. The implementation of portfolio review as an instrument for assessment allows faculty to assess the process of learning aligned with human behavior as described in Pearce's (1992) theory on the role of students in assessment.

Higher education art institutions administer *Advancement Portfolio Reviews* which is the process of reviewing a portfolio of student work in order to advance art and design students to the next stage in their degree program (Graham, 2019). Art and design faculty implement portfolios for formative assessment in the middle of the program (Scott, 2018). These kinds of portfolios can be helpful for assessment in that they include different stages of work development which, together, can demonstrate achievement by narrating the steps of the artists' creation. This process is meant to provide students with feedback on areas of improvement necessary to transition into their advanced studio classes.

While portfolios can be helpful in assessing art, there are still problems with the process (Haugnes et al., 2018). Due to the personal nature of visual arts, there is often an intimate personal connection between the student and his or her work. Students often perceive their work as an expression of personal experiences, behaviors, or feelings (Graham, 2019; Holmwood, 2019). Therefore, critique or assessment can evoke an emotional response which can limit students' creativity (Graham, 2019; Holmwood, 2019). Students' perception of the process of assessment can be stifling to their creativity (Snepvangers et al., 2018). Given the challenges of

assessment in the arts as well as the potential influence on students, higher education institutions must begin by identifying why they are assessing student work.

Reasons for Assessment

Assessment has existed since the founding of the nation's first colleges. However, in modern higher education, due to increased regulations and an escalated focus on outcomes, assessment has increased in complexity. This new focus has impacted the reasons educators participate in assessment practices. These reasons have evolved over the last three decades.

Accountability and Accreditation

Accreditation in higher education is a voluntary approval process designed to ensure the quality of educational institutions for the public (Eaton, 2015). Accreditors were established as private organizations that rely on a peer review process to provide external evaluations of educational institutions (Eaton, 2015). The goal of accreditors is to provide the public with a means to determine if an academic institution is trustworthy (Eaton, 2015). Higher education institutions rely on accreditation for granting of government funding for their students as well as for public recognition and approval. In the United States, higher education institutions can be accredited by institutional or programmatic accreditors (CHEA, n.d.; Eaton, 2015). Institutional accreditors evaluate the institution, while programmatic accreditors focus their standards to specific academic programs (CHEA, n.d.). Both kinds of accreditors develop rigorous standards and hold institutions accountable in all areas including finances, board oversight, operations, strategic planning, curriculum, facilities, services and assessment (Ewell, 2010).

Perhaps one of the most significant reasons for assessment in modern higher education is accountability. Modern higher education institutions are required to explain their practices and their outcomes to accreditors, regulators, and parents (Boud, et al., 2018; Eaton, 2015). This

focus on accountability originates from an increased national focus on outcomes due to high tuition costs and rising student loan debt. While assessment in higher education is not new, it assumed new meaning in 1990 when higher education accreditors added assessment of learning outcomes to their standards (Ewell, 2010). The Department of Education mandated the addition of these standards for accreditors in order to address changes in higher education such as an increased focus on student learning, changes in teaching modalities, and more widespread access to education. Later in 2006, the Secretary of Education's Commission on the Future of Higher Education, known as the *Spellings Commission*, highlighted the need for increased regulations on assessment and accountability (Secretary of Education's Commission on the Future of Higher Education, 2006). This Commission was tasked with exploring access, affordability, and quality of higher education. They produced a report which identified a decline in the number of students attending college in the United States. The report also described a failure of colleges to teach basic literacy skills and to prepare graduates for employment.

The need for assessment to hold higher educations institutions accountable has also been emphasized by a United States President. President Obama's focus on accountability of colleges and universities engendered a national emphasis on assessment of defined outcomes in higher education (Leaderman & Fain, 2017; Stratford, 2015). Early in his administration, President Obama publicly announced a goal to increase college graduation rates by 2020 (Stratford, 2015). Furthermore, in President Obama's 2012 State of the Union Speech, he threatened to reduce government funding if higher education institutes continued increasing tuition. This speech was just the beginning of a trend toward connecting federal aid to performance of higher education institutions. The Obama Administration became well known for defining outcomes via a score card to which institutions were to be held accountabl (Leaderman & Fain, 2017).

Accreditors of higher education institutions have also contributed to the push for assessment. Today, every accreditor includes requirements for assessment of student learning in their standards (Ewell, 2010; Suskie, 2016). As a result, many colleges and universities comprise departments dedicated to assessment work in all content areas. This was realized in a 2018 nationwide survey of 811 provosts of accredited higher education institutions which demonstrated that colleges and universities relied heavily on the support for assessment provided by dedicated research offices and assessment committees led by faculty (Jankowski et al., 2018). Modern colleges and universities are held accountable by accreditors for demonstrating student achievement by producing graduates who have met the institutions' stated outcomes (Brumwell, 2017; Suskie, 2016; Wass, 2020).

Quality Improvement

Deming's (1986; 2000) theory of quality improvement is paramount to the assessment process (Holt, 1993; Kanwar et al. 2019; Lohr, 2015; Redmond, 2008; Stensaasen, 1995; Suskie, 2018). Deming's cycle of quality improvement has been adapted to higher education assessment and is an example of best practices in assessment (Suskie 2018). Authentic assessment follows the same cycle of planning, doing, studying, and acting (Deming, 1986; 2000). The increased attention on accountability in higher education has facilitated further defining of quality assurance (Aamodt, et al., 2018; Kanwar et al., 2019; Lucander & Christersson, 2020; Mitchell, 2016). Aamodt et al. (2018) posited that assessment for accountability is more related to management control than improvement of teaching and learning. In order to resist this perception, assessment practices need to be focused on improving the quality of learning rather than accountability. Furthermore, assessment practices must be learner-centered, not teacher-

centered and should consider all stakeholders in the process (Aamodt et al., 2018; Lucander & Christersson, 2020; Mitchell, 2016).

Faculty Resistance to Assessment

Modern assessment in higher education has been met with faculty resistance (Carson, 2019, Henderson et al., 2019; Medland, 2016; Mendez, 2020; Shavelson, 2016; Taveres, 2017; Wass, 2020). Considering accreditors' focus on assessment, many higher education organizations are compelled more by the need to comply with regulations than by a desire to improve quality in their assessment practices. Essentially, they want to demonstrate compliance with accreditation standards rather than participate in meaningful, authentic assessment for learning (Carson, 2019). This focus elicits a negative reaction and resistance from faculty as it pertains to assessment (Tavares, 2017). Oftentimes, faculty and department chairs perceive assessment of student learning as just another bureaucratic task required by their administration. Black and Wiliam (1998) indicated that record-keeping can be more prevalent than understanding learning needs. They posited regulatory assessment requirements required a higher priority than the implementation of formative assessments to support student learning. Many faculty and department leaders even consider assessment as a threat, feeling the results are meant to be applied punitively (Feuerstein, 2015). For instance, faculty wonder if they will face retributive consequences if student achievement outcomes are deficient in their course. Thus, assessment practices can seem stifling and overbearing for faculty leading to resistance.

Students Perceptions of Assessment

Research has indicated that students' perception of assessment has been connected to student learning. Kaur et al., (2018) posited students' perceptions of assessment are related to

their goal orientation and, therefore, influence their learning. This qualitative study defined students' goal orientation as either motivated by performance or mastery. Mastery-oriented goals are concerned with actual, robust learning while performance-oriented goals are concerned with scores. Students with mastery-oriented goals are more inclined to maintain a positive perception of assessment because they perceive the process to improvement. On the other hand, students with performance-oriented goals perceive the process of assessment to be stressful (Kaur et al., 2018). These findings indicate the potential for authentic assessment of learning approaches to evoke positive perceptions of assessment, meet the needs of goal-oriented students, and support the achievement of learning outcomes. However, traditional knowledge-based assessments evoke negative perceptions toward assessment, promote performance-oriented goals more concerned with competing for grades than participating in learning, and do not support achievement of student learning.

Lynam (2018) also identified a need for understanding students' perceptions of assessment in order to maximize student learning. This qualitative study evaluated students' perception of learning assessment in relationship to their achievement of learning ($N = 23$). The study employed focus groups to collect data on student perception of types and timing of assessments as well as student factors such as academic maturity and both positive and negative emotions resulting from the assessment process. Analysis of the data identified themes of teaching factors including types and timeliness of assessments and student factors including maturity and emotions. These themes and student verbal feedback supported student engagement in learning through assessment. This is consistent with authentic assessment of learning as described previously. Similarly, Wass et al. (2020) in a study of 40 undergraduate students, found that 20 students exhibited significant negative emotional reactions to assessment including

annoyance, frustration, and disappointment. These negative perceptions influenced students' well-being by creating stress and anxiety due to perceived lack of control over the process of assessment. The students in this study connected their negative response to the assessment process to the quality of their achievement of learning outcomes.

Previous research indicates students' perception of assessment and the types of assessment can critically influence whether student learning is *deep* versus *surface* (Boud, 2000; Gerritsen-van Leeuwenkamp, 2019; Kaur et al., 2018; Lynam, 2018; Wass, 2020). Deep learning is more often associated with positive perceptions of assessment while surface learning is more prevalent among negative perceptions of assessment (Gerritsen-van Leeuwenkamp, 2019; Kaur et al., 2018; Lynam, 2018). Kaur et al. (2018) stressed the importance of creating positive assessment experiences to support learning. The types of assessment can also determine whether learning is deep or surface. For instance, Kaur's (2018) qualitative study ($N = 41$) implemented interviews and reflective writing to analyze students' experiences with assessment. Based on coding and review of data categories, student responses indicated multiple choice assessments more often produced surface learning, while essays produced deep learning. Student engagement in the process through performance assessments, the application of substantive feedback, and self-reflection supports student achievement of learning outcomes.

Kaur (2018) described the importance of understanding the student experience in assessment. By understanding the students' perceptions of the assessment process, faculty can design assessments that include students in the process of learning. Similarly, Preston et al. (2020) found student learning is generally dependent on students' perceptions of the assessment process. Preston et al. collected quantitative data from a questionnaire as well as qualitative data from focus groups to measure students' perceptions of assessment. This study's results indicated

a direct relationship between student effort and the type of assessment. For example, key feature problems were found to be an effective tool reflective of the learning effort by 50.8% of participants, short answer questions by 46.2% and multiple station assessment tasks by 31.6%. Students who knew their assessments would be authentic measures of their learning exerted more effort into understanding the curriculum. Key feature problems were identified by 48.3% of participants as the most accurate assessment tool when it came to demonstrating student knowledge of content material. Conversely, knowledge-based assessments evoked less preparation and understanding. For example, only 6.5% of participants rated reflective writing, 8.2% essays, and 8.4% mini-practical exams as accurate assessment tools (Preston et al., 2020). This study supports the need for assessment practices that are authentic and supportive of student learning.

Foundational Studies

Gerritsen-van Leeuwenkamp (2019) has performed much work in the study of students' perception of assessment and achievement of learning. This work began with developing and validating instruments for measuring this type of data (Gerritsen-van Leeuwenkamp et al., 2018). In this initial study, Gerritsen-van Leeuwenkamp et. al (2018) sought to develop an instrument to measure student perception of assessment. The study applied an assessment-related review of the literature to create these instruments. It was through this process that six variables related to assessment quality were validated. These included: effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of test scores, authenticity of assessment, and credibility of assessment (Gerritsen-van Leeuwenkamp, et al., 2018). This study resulted in the development of the *Students' Perceptions of Assessment Quality Questionnaire* (SPAQQ). The SPAQQ instrument and these six variables have been adopted for this study.

Gerritsen-van Leeuwenkamp's (2019) study aimed to measure the relationship between students' perception of assessment and their learning approaches and the relationship between students' perception of assessment and their learning outcomes. This study included 204 participants. All participants were students attending a university in the Netherlands. The study administered the SPAQQ developed in the Gerritsen-van Leeuwenkamp, et al. (2018) study to measure student perception and student grades to quantify learning. The approaches to learning and studying inventory (ALSI) were implemented to measure learning approaches.

Gerritsen-van Leeuwenkamp's (2019) study conducted a multiple regression analysis to determine the relationships between the predictor and criterion variables for two research questions. In response to the first research question, the results identified a significant relationship between perceptions of assessment quality and learning approaches (adjusted for R^2 = .051). These results underscored a positive relationship between student perception of assessment quality and learning outcomes. While this study demonstrated a definite need for higher education to consider students' perception when creating assessment, it was primarily limited to undergraduate students in health care programs.

Gerritsen-van Leeuwenkamp's study underscores the need for students to be the primary consideration when designing assessment. Considering the goal of assessment is to measure student learning and then implement adjustments to curriculum and services to improve that learning, higher education institutions must connect student perception of assessment with the achievement of learning outcomes. Specifically challenging is assessment of students in the field of game art.

SPAQQ Variables

This study administered the SPAQQ assessment tool as presented in Gerritsen-van

Leeuwenkamp's (2019) research to determine if there is a relationship between game students' perception of assessment quality and their learning. The SPAQQ included six predictor variables which are also central to this research. These variables are described below.

Effects of Assessment on Learning

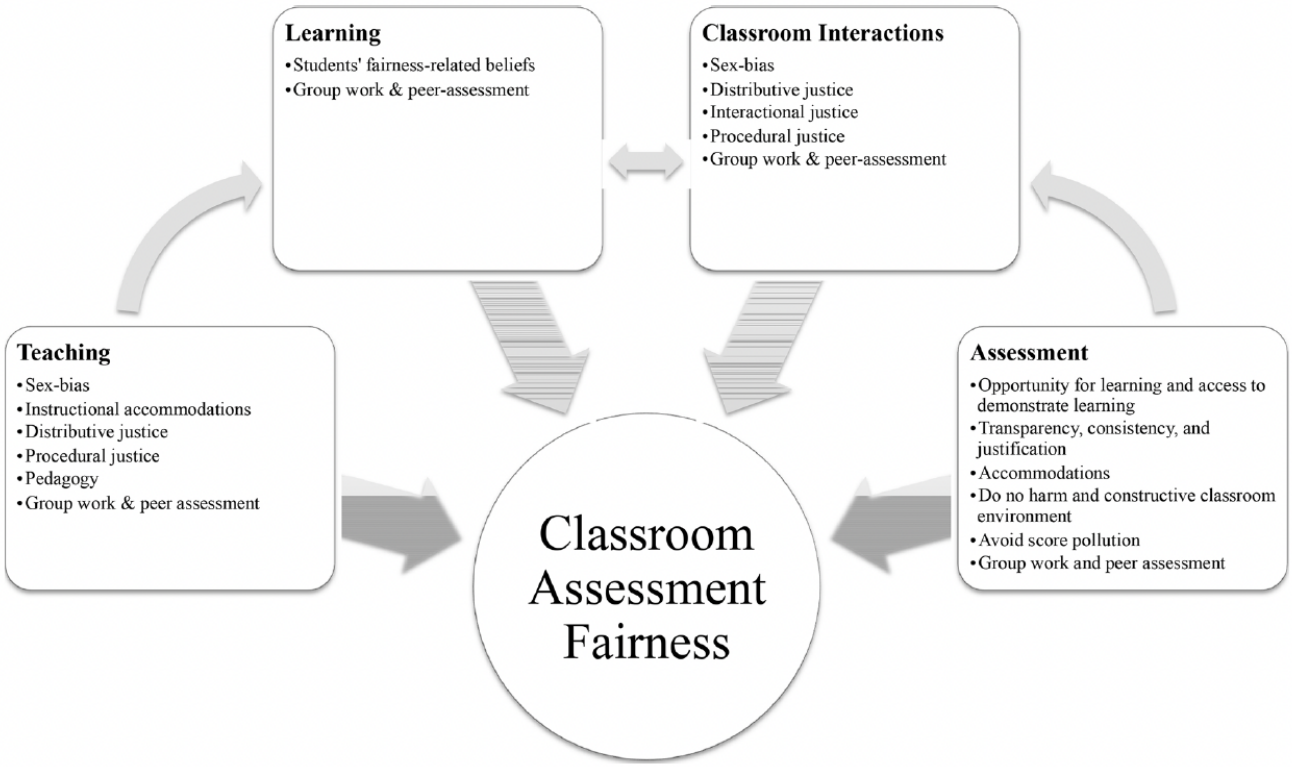
The first factor, *effects of assessment on learning*, embodies how a particular assessment influences both the process and progress of student learning. The SPAQQ instrument was designed to measure these effects. Questions pertaining to the assessments' effects on motivation, retention of competencies, confidence, preparation for future learning, clear feedback on strengths and weaknesses, as well as the value of the assessment for the student were incorporated in the instrument. Value of assessments include instances of learning and time expended on work as well as the ability of students to navigate their own learning process.

Fairness of Assessment

The second factor, *fairness of assessment*, includes whether the requirements of the assessment are equitable and whether the assessment accurately reflects the learning outcomes (Gerritsen-van Leeuwenkamp et al., 2019). Fairness of assessment can convey different meanings for students and teachers. Therefore, it is important to adequately define fairness. Rasooli et al. (2018) identified fairness of assessment by analyzing literature in the field. This study concluded that fairness of assessment can be accurately described by six primary themes pertaining to the assessment domain and eight primary themes regarding the non-assessment domain as depicted in Figure 5.

Figure 5

Classroom Assessment Fairness in the Intersection of Four Elements of Classroom Practice



Note: From *Re-conceptualizing classroom assessment fairness: A systematic meta-ethnography of assessment literature and beyond (p.177)* by Rasooli et.al 2018.

Conditions of Assessment

The third factor, *conditions of assessment*, references situations that are outside of student control. These may include the format of the assessment or the faculty competence in administering the assessment (Gerritsen-van Leeuwenkamp et al., 2019). The SPAQQ instrument was designed to measure conditions of assessments via questions pertaining to organization, timing, feedback, faculty capability, external factors, weight of assessment on overall grade, construction of assessment, and correctness of language. Wools (2015) argued that

assessments should be created based on their intent and should include a set of standards to ensure quality. Because the results of assessment are often highly influential, the quality of assessment instruments is critical.

Interpretation of Test Scores

The fourth factor, *interpretation of test scores*, is defined as how well the results of the assessment measure the achievement of the learning outcomes (Gerritsen-van Leeuwenkamp et al., 2019). The SPAQQ instrument was designed to measure interpretation of test scores via questions pertaining to whether scores reflect mastery of the subject, comparability of scores on the same topics, and comparability of scores when assessments are completed multiple times. Wools (2010) associated the interpretation of test scores with validity. Validation of assessment results is the process of appraising whether the interpretations of the results are appropriate. Scorers or graders make decisions regarding students' abilities by interpreting their performance on assessments. This is an actual activity and can be achieved through norming or calibration of scorers.

Calibration of scorers involves comparing results of assessment across multiple scorers to determine similarities and differences to agree on what constitutes achievement. Validation of assessment results can also be achieved via an argument-based approach (Wools, 2010). This approach includes the development of the assessment tool and a critical evaluation of the claims made in the development process. During this process, the scorer infers in order to clarify the process needed to interpret the students' performance to accurately adjudicate their level of competence. Calibration or argument-based validation are important for appropriate interpretation of assessment results.

Authenticity of Assessment

The fifth factor, *authenticity of assessment,* includes how well the assessment reflects the demands of the industry for which the students are preparing to work (Gerritsen-van Leeuwenkamp et al., 2019). The SPAQQ instrument was designed to measure authenticity of assessment with questions relating to whether the competencies being assessed relate to the competencies needed for students' futures. Preston et al.'s (2020) study identified themes from a focus group of 23 medical students. The qualitative data from this study, in the form of student comments, indicated students considered assessments to be relevant when they related to clinical practices. Students exerted more effort into the assessment that was considered authentic in this regard.

Credibility of Assessment

The sixth factor, *credibility of assessment,* is defined as the students' acceptance and faith in the assessment (Gerritsen-van Leeuwenkamp et al., 2019). The SPAQQ instrument was designed to measure this factor via questions pertaining to how students are examined, how the results are implemented to adjust teaching, trust in quality of assessment, students' involvement in the assessment, and independent judgements of the rater. In a review of 80 publications regarding credibility of assessment, Long et al. (2021) was unable to identify a firm definition of *credibility* in relationship to assessment. However, 27 terms were considered to relate to students' perceived credibility including 23 examples of the term *useful*, 17 examples of the term *fair* and 10 examples of the term *valuable*.

Game Art

The visual art of game design evolved from traditional board games to penny arcades and coin-operated arcade games such as pinball machines (Envato, 2017; Romero, 2016). Changes to technology allowed for the creation of the first video or computer games in the 1960s (Envato,

2017). The first video games were black and white and limited by technology. As technology advanced, so did the games. Artists and engineers collaborated to create visual worlds via graphics, color, and technology to build environments and convey stories designed to immerse the players (Envato, 2017). These stories are often inspired by social, political, and economic world events (Envato, 2017; Romero, 2016).

Academic programs focus on the mechanics of video games, however, there are also an increasing number of programs specific to the creation of art in video games (Higher Education Video Game Alliance, 2015). Because of the dynamic expansion of the game industry, higher education institutions have expanded their curriculum in game design. Since the first computer gaming educational degree program in 1998, education in game art has dramatically expanded (Altizer et al., 2017). Based on a survey from the Higher Education Video Game Alliance (2015) at that time, academic programs had expanded to over 300 schools offering certificate, undergraduate, and graduate level programs in multiple areas of game design. This expansion continues across the world. Game design includes the development of video games and is often taught in engineering or computer science programs. Game art programs focus on the artistic endeavor within computer video games (Higher Education Video Game Alliance, 2015). Students are taught to create the artwork within the games whether it is environments, costumes, characters, or products such as weapons.

Game art curriculum includes liberal arts courses as well as courses such as History of Game Art, Fundamentals of Storytelling, Figure Drawing, Concept Sketchbook Ideation, Modeling for Game, Character Design for Games and courses on animal and creature drawing, texture painting, and lighting and rendering (LCAD, 2022). Graduates are prepared for employment in an array of game studios across the United States such as Blizzard Entertainment,

Walt Disney Animation Studios, Insomniac Games, Obsidian Entertainment, as well as smaller studios. Job titles may include art directors, concept artists, creature designers and even architects. This research will be specifically focused on game art students (LCAD, 2022).

Game Art Learning Outcomes

The game art portfolio assessment reviewed in this research includes faculty analysis of student work in relationship to specific learning outcomes. These outcomes include digital rendering and composition. Students will be reviewed on their ability to simulate 3D forms in a 2D space, create lighting that appears believable and legible, and create texture details to simulate different materials and surfaces in their work. In game art, 3D refers to items which appear to have depth or three dimensions. Contrarily, 2D refers to work with only two dimensions showing space that does not have the appearance of depth (LCAD, 2021).

The next outcome is focused on observational and life drawing. Students will be reviewed on their ability to work from visual observation when drawing from life, represent the legibility of the original observed object, and simulate forms, surface material, textures, and proportion of the original object through observational study. The next outcome is focused on perspective: Students will be reviewed on their ability to simulate depth and understanding of 3D forms through one-, two-, and three-point perspective techniques (LCAD, 2021). The next outcomes refer to conceptual ideation. Students will be reviewed on their ability to execute conceptual ideations through critical thinking and problem-solving skills, thoroughly research and explore their visual ideas various ideation passes (silhouettes, rough drawings, etc.), and show the legibility, functionality, and application of their concepts from a thoroughly researched visual library (LCAD, 2021). The next outcome pertains to 3D prop models and final renders: students will be reviewed on their ability to understand and utilize 3D forms to create 3D props

and assets, create high quality textures for their 3D props, and display their work with clean renders that showcases their models in an attractive way. The next outcome measured includes 3D prop models and geometry and UV layout. Students will be reviewed on their ability to demonstrate understanding of the principles of topology and polyflow through presenting clean, cohesive geometry, work from and stick to a poly budget without exceeding it, unwrap and pack their UVs in a clean, cohesive UV layout, implement a texture resolution that makes sense for the size and functionality of their 3D model, and utilize all available UV space possible for the maximum amount of detail for the resolution used. In game, UV refers to the two geometrical coordinates used on computers to design a 2D visual of a 3D object. Next, 3D prop models and texture maps are measured. Students will be reviewed on their ability to create various types of texture maps (diffuse, alpha, normal, specular, etc.) and create high quality textures for their 3D models. After this, 3D environment and final renders is measured: Students will be reviewed on their ability to demonstrate understanding of utilizing 3D forms at an environmental scale, organized in a cohesive, interesting and visually appealing composition, simulate believable visual lighting information that works well throughout their environmental setup and composition, provide visual storytelling elements throughout their environment, as well as work with their environment as a whole through lighting and composition, and display their work with clean renders that showcases their environment in an attractive way (LCAD, 2021).

Another outcome measured is 3D environment including prop kit and modular pieces. Students will be reviewed on their ability to understand the principles of modular modeling techniques for 3D environments, utilize modular modeling techniques for building out environments through modular geometry, and implementing props and assets from a prop kit specific to their environment. Next, 3D environment including trim sheet and texture mapping is

reviewed: Students will be reviewed on their ability to understand the application and execution of trim sheets for modular 3D environments, create their own trim sheets, implement a texture resolution specific to each trim that makes sense for the size and functionality of their application in their 3D environment, utilize all available UV space possible for the maximum amount of detail for the resolution implemented, create various different types of texture maps (diffuse, alpha, normal, specular, etc.), and create high quality textures for their 3D models (LCAD, 2021).

The next outcome measured pertains to storyboard layout. Students will be reviewed on their ability to execute visual storytelling techniques through storyboarding, utilize engaging camera positioning and techniques that make their boards visually engaging, cohesively frame their boards to create successful and interesting compositions, and display and execute strong visual narrative. Next, visual storytelling is measured. Students will be reviewed on their ability to execute visual storytelling techniques through drawing and illustration, utilize lighting and color techniques that make their composition engaging and meaningful, cohesively frame their illustrations with impactful compositions to create visual storytelling cues, and display and execute a strong visual narrative through a single illustration (LCAD, 2021).

Finally, a team project, including work, contributions, and team duties is measured. Students will be reviewed on their ability to work collaboratively with multiple people in a team-oriented environment, contribute work of substance and merit to a team project, and work according to pipelines, deadlines, and execute tasks according to their duties and responsibilities designated to them by their team. These outcomes have been identified by the game art department chair and faculty as essential for transitioning into the second half of the curriculum

in the Bachelor of Fine Arts in Game Art degree program. Therefore, they are all assessed as part of the formal portfolio review process (LCAD, 2021).

Summary

In reviewing the literature pertaining to assessment in higher education, assessment is critical to quality improvement, accountability, and accreditation. While there are still many barriers to assessment, research shows assessment can support teaching and learning (Amodt, 2018; Brumwell et al., 2017; Preston et al., 2020; Rhodes, 2016; Rust, 2016). However, much can be learned about the effects of the perception of assessment on student learning. Furthermore, research has demonstrated that in order to be effective, faculty must understand and disassemble the barriers to the effective practices and application of assessment results (Henderson et al., 2019; Medland, 2016; Shavelson, 2016; Wass, 2020; Zlatkin-Troitschanskaia et al., 2018). Students must be at the center of these practices and even included in the process.

While some research has been conducted on student perceptions of assessment (Gerritsen-van Leeuwenkamp, 2019; Kaur et al., 2018; Lynam, 2018; Mulliner and Tucker, 2017; Pavlenko, 2020), a gap exists in the literature in regard to assessment of the creative disciplines such as game art. As higher education transitions to a learner-centric method of teaching and learning, assessment practices must as well. Students' perceptions can influence how assessment is received and how it affects their learning (Gerritsen-van Leeuwenkamp, 2019; Kaur et al., 2018; Lynam, 2018; Mulliner and Tucker, 2017; Pavlenko, 2020). While research supports this theory in relationship to students in higher education in many disciplines, little is available regarding art students' perception of assessment and the influence on student learning. While the literature clearly demonstrates challenges in assessment in the arts, it does not include studies specific to game art students' perceptions of assessment. Given the complexity of

assessment in the visual arts, this emerging field of game art education warrants further research. This study will advance the research by Gerritsen-van Leeuwenkamp but will examine perceptions of game art students to better understand the complexity of assessment in the arts.

CHAPTER THREE: METHODS

Overview

The purpose of this quantitative, predictive, correlational study is to examine the potential for undergraduate game art students' perceptions of assessment in higher education to influence their achievement of specific learning outcomes. Chapter three begins by introducing the design of the study, including full definitions of all variables. The research questions and null hypotheses follow. The participants and setting, instrumentation, procedures, and data analysis plans are also presented.

Design

This study applied a non-experimental, quantitative, predictive correlational design to analyze how accurately student achievement on undergraduate game art advancement review portfolio can be predicted by the linear combination of predictor variables including perception of *effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment,* and *credibility of assessment*. Quantitative, non-experimental design is appropriate because it is ideal for analyzing relationships. Quantitative research is also repeatable.

This research advances a previous research study which also implemented a quantitative, non-experimental survey design (Gerritsen-van Leeuwenkamp, et al., 2019). Gerritsen-van Leeuwenkamp's study sought to analyze the relationship between students' perception of assessment quality, their learning approaches and their achievement of learning. That study focused specifically on undergraduate students in the health sciences and found positive relationships between students' perceptions of assessment quality and student learning.

A predictive correlational design is appropriate for this study because it is best suited for analyzing the relationships between multiple predictor variables in one study (Gall et al., 2007). This type of design is limited in that it cannot infer cause and effect relationships between variables. Correlational research is appropriate for studies in the field of education. This type of research will enable the determination of the strength of the relationships between the criterion variable and the six predictor variables (Gall et al., 2007).

The criterion variable, student achievement of undergraduate game art advancement review portfolio, was represented by the scores achieved on the assignment. Scores ranged from 53 to 245 and were either categorized as *pass* or *no pass*. A score of *no pass* resulted in the development of an academic tutoring plan to help students improve their achievement of the learning outcomes. Faculty provided students with specific feedback on each outcome. The predictor variables including *perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment,* and *credibility of assessment* were defined by the ratings on the related questions from the survey instrument administered in this study (Gerritsen-van Leeuwenkamp, et al., 2019). Gerritsen-van Leeuwenkamp's (2018) previous work used a literature review to identify the predictor variables as key factors for representing the effects of assessment on learning. This study determined the six predictor variables combined were able to measure students' unique perceptions of assessment including their expectations and perceptions of the quality of assessment.

Research Question

The following research question guided this study:

RQ1: How accurately can student achievement on advancement review portfolio assessment be predicted by the linear combination of *perception of effects of assessment on*

learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment, and *credibility of assessment* for undergraduate game art students?

Hypothesis

The null hypothesis for this study is:

$H_0$1: There will be no significant predictive relationship between the criterion variable, student achievement on their advancement review portfolio assessment and the linear combination of predictor variables including *perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment,* and *credibility of assessment* for undergraduate game art students.

Participants and Setting

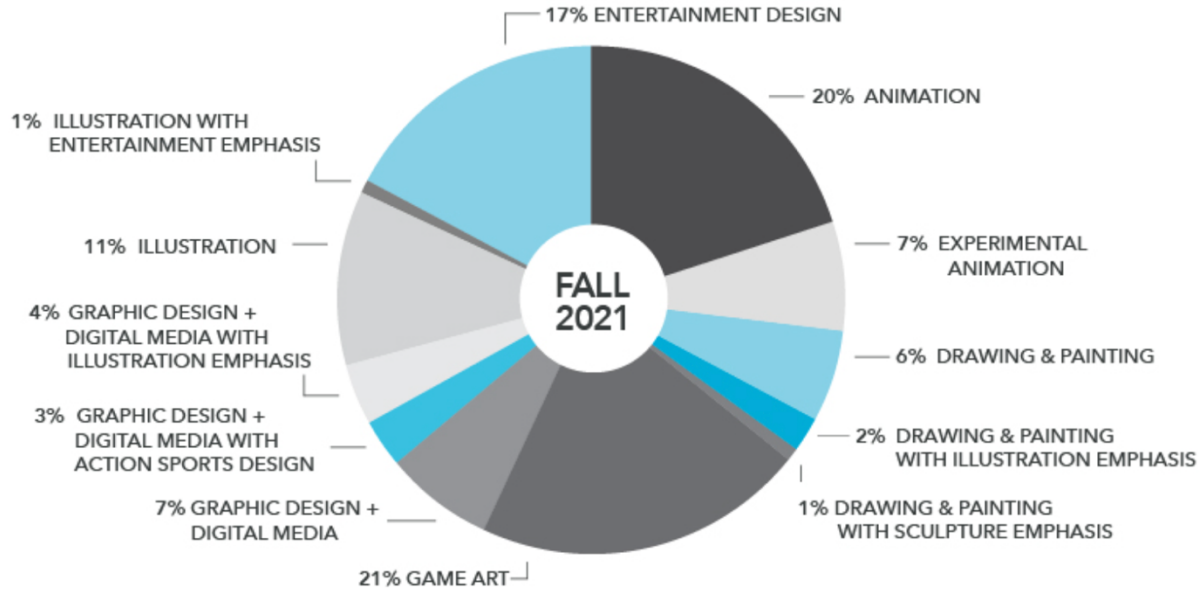
This non-experimental, quantitative, predictive correlational design study involved a convenience sample of undergraduate college students. This section will describe the population, participants, and setting inherent to this study.

Population

The population in this study includes undergraduate students enrolled in a Southern California Art and Design college where the researcher is employed. Based on Fall 2021 enrollments, the enrollment by academic program is disaggregated in Figure 6.

Figure 6

Breakdown of Enrollment for Game Art Program



Note. Data produced and provided by college registrar.

The population is composed of 74% females and 24% males. Students are primarily white (47%) with 23% Hispanic, 14% Asian, 7% two or more races, 5% non-resident Alien, 2%, black/African American, 1% American Indian/Alaska Native and 1% unknown.

Participants

Participants included students enrolled in the game art program scheduled to participate in their advancement portfolio review during the spring 2021, fall 2021, and spring 2022 semesters. The participants were chosen by the department chair and the college registrar. Students who had earned between 28-97 out of a possible total 122 credits were eligible for portfolio review. The number of credits completed is a standard indicator of eligibility for the advancement portfolio review assessment process at the college. The sample consisted of 23

male, 26 female students and 09 non-binary students enrolled in the Bachelor of Fine Arts in Game Art program. The sample included 29 white, 10 Hispanic, 10 Asian, and 5 two or more races, 2 non-resident Alien and 3 unknowns. Participants included 29 sophomores, 25 juniors and 5 seniors. The mean GPA for the participants was 3.48. For this study, the number of participants sampled was 59 which was less than the required minimum sample size when assuming a medium effect size with statistical power of .7, $\alpha = .05$ (Gall et al., 2007). The game art program was selected because it includes the largest enrollment in the college.

Setting

The setting for this study was a small, non-profit school offering onsite programs in art and design at both the undergraduate and graduate level. The college is dually accredited by the Western Association of Schools and Colleges (WASC) Senior College and University Commission and by the National Association of Schools of Art and Design (NASAD), in addition to being a member of the Association of Independent Colleges of Art and Design (AICAD). The college enrolls more than 700 students in Bachelor of Fine Arts programs in the following art and design programs: Animation, Drawing and Painting, Entertainment Design, Experimental Animation, Game Art, Graphic Design and Digital Media and Illustration. All of the curricula emphasize acquiring skills based on observation, representation, and concept development, while embracing the challenges of innovative technologies.

Instrumentation

Perception of assessment and quality of assessment were measured using the *Students' Perceptions of Assessment Quality Questionnaire* (SPAQQ) created by Gerritsen-van Leeuwenkamp, et al. (2019). Student learning was assessed using a portfolio review of student work. Portfolios were assessed using a rubric measuring 12 learning outcomes determined by

faculty to be key indicators of students' preparedness for advancing into the second half of the curriculum (See Appendix A for instrument). A five-point analytic rubric was created by the game department chair for implementation in assessing portfolios of student work.

SPAQQ

The SPAQQ survey instrument is appropriate for administration in the current study because it was developed specifically to measure students' perception of assessment. The instrument was originally used to with undergraduate health sciences college students. Via the social media platform LinkedIn, the researcher contacted Gerritsen-van Leeuwenkamp to request permission to administer the instrument. Gerritsen-van Leeuwenkamp replied indicating the instrument was open source and could be administered by anyone (See Appendix B for permission to use the instrument).

The instrument was developed via a literature review of scholarly research pertaining to the quality of assessment (Gerritsen-van Leeuwenkamp et al., 2018). A series of questions were developed as a result of the literature review analysis and validated by a sample of 213 undergraduate college students. The principal axis factoring (PAF) of the SPAQQ identified effects of assessment on learning (α =. 94); fairness of assessment (α = .81); credibility of assessment (α = 88), conditions of assessment (α = .94) and authenticity of assessment (α = .82). Gerritsen-van Leeuwenkamp et al. (2019) also demonstrated a degree of reliability between .76 and .94. If α = .70 or higher, the instrument is reliable (Warner, 2013).

This instrument was administered in another study conducted by Gerritsen-van Leeuwenkamp et al. (2019). The SPAQQ survey was designed based on a literature review of assessment in higher education informed by the theory that perception of assessment can influence the achievement of learning (Gerritsen-van Leeuwenkamp et al., 2018). The survey

was specifically designed to measure the perception of assessment of college-aged undergraduate students. Demographic questions were added to ascertain participant gender identification as well as their race and ethnicity. Table 1 demonstrates the reliability of each criterion comprising the survey.

Table 1

Reliability of the SPAQQ

Scale	Number of items	α	Mean	SD
1. Effects of assessment on learning	11	.89	4.93	0.97
2. Fairness of assessment	5	.78	5.22	1.06
3. Conditions of assessment	8	.81	4.96	1.01
4. Interpretation of test scores	4	.75	4.94	1.01
5. Authenticity of assessment	5	.76	4.89	1.00
6. Credibility of assessment	6	.81	4.67	1.14

Note. Gerritsen-van Leeuwenkamp, et al., 2019, p.74.

The survey is comprised of a question related to gender identity, race and ethnicity, and 39 closed-ended questions including six facets or subscales. Participant scores are calculated for each facet based on the questions included. *Perception of effects of assessment* on learning comprised 11 items. *Perception of fairness of assessment* comprised 5 questions items. The *perception of the conditions of the assessment* comprised 8 items. The *perception of interpretation of the scores* comprised 4 items. The *perception of the authenticity of assessment* comprised 5 items. Finally, the *perception of credibility of assessment* comprised 6 items. Table

2 demonstrates the Facet Subscales and the associated question numbers.

Table 2
Facet Subscales of the Students' Perceptions of Assessment Quality Questionnaire (SPAQQ)

Facet Subscales	Item Numbers
Effects of assessment on learning	34, 33, 37, 38, 39, 40, 41, 36, 13, 30, 31
Fairness of assessment	1, 5, 7, 12, 4
Conditions of the assessment	19, 21, 32, 20, 15, 18, 24, 16
Interpretation of the scores	25, 26, 27, 28
Authenticity of assessment	2, 8, 9, 10, 11
Credibility of assessment	17, 35, 22, 23, 42, 43

Note. Gerritsen-van Leeuwenkamp, et al., 2019, p.80.

A score of 39 was the lowest possible score, meaning that participants' perceptions of assessment were the most negative. The highest possible score was 273, meaning participants exhibited the most positive perceptions of assessment. Scores were automatically calculated within SurveyMonkey, a cloud-based tool designed to create, send and analyze surveys.

Participants were asked to recollect their perceptions at the beginning of the semester, prior to the assessment, and their perceptions at the time of the survey which was administered upon completion of the portfolio assessment and after receiving the results and feedback of the assessment (Gerritsen-van Leeuwenkamp et al., 2019). For the 39 survey items, participants recorded responses via a seven-point Likert scale which included the following choices: *strongly disagree, disagree, disagree somewhat, undecided, agree somewhat, agree, strongly agree* (Gerritsen-van Leeuwenkamp et al., 2019). Participants were specifically asked to consider the Advancement Review Portfolio as the testing and assessment asked about in the survey (See

Appendix C for instructions).

Portfolio Review

Student achievement on the game art advancement review portfolio was measured via actual student results as scored using a rubric. The same two college faculty collaborated to assess student work using one rubric for each student. Results were calculated by averaging the results of a five-point analytic rubric which defined the criteria for assessment (See Appendix D for rubric). Choices in the rubric included *Little to None, Basic, Average, Good, and Excellent*. The two-faculty evaluated student work, scoring each of the twelve learning outcomes using these options. The faculty scored all the portfolios together providing feedback on each outcome and then agreeing on a final score of *pass or no pass* for each portfolio.

Procedures

The researcher re-created Gerritsen-van Leeuwenkamp's SPAQQ in Survey Monkey. Questions were presented in a multiple-choice matrix with a drop-down menu of answers. The researcher copied the questions from Gerritsen-van Leeuwenkamp's survey (2019) into a Word document and corrected minor spelling errors prior to arranging in SurveyMonkey. To provide more clarity for participants, questions were slightly modified replacing the terms *testing and assessment* with *Advancement Review Portfolio assessment*. These minor changes will not affect the reliability or validity of the survey instrument. In creating the survey in Survey Monkey, the *Classic* survey style was selected indicating all the questions as the best option for longer surveys with multiple pages. This option allows respondents to ascertain briefly the number of questions requiring a response. Next, the questions were copied from the Word document and pasted into SurveyMonkey. A hard return was entered after each question to create 39 separate questions. Responses to all 39 questions were designated as *required*. For each question, the

multiple-choice option was designed with *Agree – Disagree* responses. Seven choices were automatically populated when this option was selected. Finally, in order to collect demographic data, the researcher added a question regarding gender identity and a question regarding race/ethnicity to the beginning of the survey. Questions were presented one after the other with a *Done* button after the last question indicating survey completion. SurveyMonkey software estimated seven minutes required to complete the survey.

A variety of approvals were required before the research was begun. Just prior to submitting for approval from the Liberty University IRB (See Appendix E for IRB approval), the researcher submitted a formal request to the college's chief operating officer to conduct the study with students enrolled in the college's game art program for the 2021-2022 academic year. Once permission was granted (See Appendix F for college approval), the researcher met with the department chair to discuss the study and to ensure the same rubric was applied to assess all portfolios. Once these approvals were granted the researcher was able to begin collecting data.

The study was introduced to the participants two weeks prior to sending the survey. At this time, participants were contacted via email through the college's database and asked if they would participate in the research study. The email request was sent from the college registrar on behalf of the researcher (See Appendix G). A 20-dollar electronic Starbucks gift card was offered as an incentive for all who participated. Students who agreed to participate and electronically consented and returned the informed consent form to the college registrar (See Appendix H for participant informed consent form) were then sent the *Students' Perceptions of Assessment Quality Questionnaire* (SPAQQ) survey via SurveyMonkey. The SPAQQ was embedded within an email sent directly from SurveyMonkey including an introduction with instructions directing participants to focus their responses on their portfolio review assessment

experience. These instructions were provided in the first section of the digitized survey in SurveyMonkey (See Appendix I for instructions). Once all consent forms were collected via email, participant email addresses were added to Survey Monkey and the survey was sent.

The researcher followed several steps to collected data. Participants received an email directly from Survey Monkey which embedded the first question of the survey. If they chose to participate in the survey, they answered the question, which automatically directed them to the rest of the digitized survey in SurveyMonkey. Questions were provided sequentially with multiple choice options. Students were required to answer all of the questions and select the *Done* button when they had completed all the questions. If any questions were left unanswered, a pop-up message would indicate which question required an answer so participants could return and complete. The survey could not be submitted unless all questions were answered. If participants decided they did not want to complete the survey, they would have to close the application on their computer. Any responses would be lost, but they could access and retake the survey later. If they chose not to participate in the survey at all, they simply ignored the email.

Participants were assigned two weeks to respond to the survey. Participants who did not respond received email reminders after three days, seven days, and again the day before the survey closed (Dillman & Christian, 2014) (See Appendix J for emails). The message was slightly revised for each reminder encouraging participation and promoting the incentive. Participants who completed the surveys were sent the gift card via email with a note of appreciation. Completion of all questions was required in order to receive the gift card.

The college registrar collected and coded the data. When the participants completed the surveys, the registrar retrieved the data from SurveyMonkey in the form of a Microsoft Excel spreadsheet. A pre-code was assigned to each student in order to pair survey results with

portfolio review assessment scores. No student identifiers were included in the data retrieved by the researcher. Scores for all students who had completed the advancement portfolio review assessment during spring 2021 and fall and spring semesters of the 2021-2022 academic year were requested by the researcher from the registrar. These data were dummy coded by the registrar prior to assignment to the researcher. A coding system of 01 through 85 was implemented by the registrar to confidentially represent the participants' identities.

All variable data were collected and entered via SPSS student edition, a statistics software. Data were stored on the researcher's personal password-protected computer. When not being utilized, the computer was stored in a locked office. The data will be retained for a period of five years after the completion of this research study. Once all data were collected and entered into SPSS, the analysis process began.

Data Analysis

A multiple regression analysis was most appropriate for this study so as to effectively measure the relationship between the criterion variable, *student achievement on the undergraduate game art advancement review portfolio* as measured by the Advancement Review Rubric and the six predictor variables, *perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment,* and *credibility of assessment* as measured by SPAQQ (Gall et al., 2007). Multiple regression analysis is most appropriate because it is consistent with the current research question. Multiple regression allows for the determination of the strength and direction of the relationship between perception of assessment and quality of the assessment and student achievement on the undergraduate game art advancement review portfolio. This type of analysis can also identify a potential predictive causality between predictor and outcome variables (Gall et al., 2007).

Furthermore, multiple regression can also be conducted to examine the validity of each predictor variable.

Gerritsen-van Leeuwenkamp et al. (2019) implemented multiple regression analysis to measure the relation of students' perceptions of assessment quality to their learning approaches and learning outcomes. This study included 204 undergraduate students enrolled in applied sciences programs at a Netherlands university. Gerritsen-van Leeuwenkamp's study was the foundation for this research. Administering the same instrument and statistical analysis allowed for this research to expand Gerritsen-van Leeuwenkamp's study with a focus in the area of game art.

Data were visually screened to investigate for missing values and inaccurate entries (Warner, 2013). In order to ensure the data are reliable and valid, assumptions were tested via the SPSS student version statistics software (Warner, 2013). The assumption of bivariate outliers was tested by constructing scatter plots between all pairs of the predictor variables and combinations of the predictor and criterion variables. The researcher sought to determine if the variables were linearly related. If the variables are not linearly related, the power of the test is reduced. Scatter plots were constructed to test for this assumption. The researcher sought to identify if the variables were linearly related. Plots were created for each pair of predictor variables (x, x) and between the predictor variables (x) and the criterion variable (y). The classic "cigar shape" is indicative of (Green & Salkind, 2017) the strength of the relationship between the variables.

Examination of potential multicollinearity among the predictor variables is imperative in order to ensure the predictors were not overly similar. The researcher sought to determine if each predictor variable (x) was highly correlated to another predictor variable (x). If so, they would

provide the same information about the criterion variable. The coefficients table produced in the SPSS output is indicative of all variance inflation factors (VIFs). If a VIF is greater than 10, it is indicative that the assumption has been violated. Acceptable values are between 1 and 5.

After confirming all assumptions had been met, a multiple regression analysis was conducted to test the null hypothesis: there will be no significant predictive relationship between the criterion variable student achievement on their advancement review portfolio and the linear combination of predictor variables, perception of assessment and quality of assessment for undergraduate game art students. The R^2 statistic determines the predictive significance of the relationship between advancement review portfolio scores and each of the six predictor variables described (Green & Salkind, 2017). The decision to reject will be determined at the 95% confidence level, $\alpha = .05$. As is appropriate for multiple regression analysis, the effect size will be determined by applying Cohen's f^2 (Cohen, 1988).

CHAPTER FOUR: FINDINGS

Overview

This chapter details the results of the data analysis for this study. The purpose of this quantitative, non-experimental, predictive correlational study is to analyze how accurately student achievement on undergraduate game art advancement review portfolio can be predicted by the linear combination of predictor variables including *perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment*, and *credibility of assessment.* This chapter provides analysis of the six predictor variables and one criterion variable. Descriptive statistics as well as the results of the statistical analysis for the study are included.

Research Question

RQ1: How accurately can student achievement on advancement review portfolio assessment be predicted by the linear combination of *perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment*, and *credibility of assessment* for undergraduate game art students?

Null Hypothesis

$H_0$1: There will be no significant predictive relationship between the criterion variable, student achievement on their advancement review portfolio assessment and the linear combination of predictor variables including *perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment,* and *credibility of assessment* for undergraduate game art students.

Descriptive Statistics

The participants in this study included undergraduate Game Art students enrolled in an art and design college. The college was located in Southern California. The number of participants sampled was 59. This number did fell below the required minimum sample size when assuming a medium effect size with statistical power of .7, $\alpha = .05$ (Gall et al., 2007).

Descriptive statistics for the predictor variables of perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment, and credibility of assessment and the criterion variable of scores on advancement portfolio reviews for the sample ($N = 59$) are presented in Table 3. The six predictor variables were based on six facet subscales determined by responses to survey questions specifically related to each predictor variable. Effects of assessment on learning was determined by responses to questions 1-11; fairness of assessment included questions 12-16; conditions of assessment: 17-24; interpretation of assessment: 25-29; authenticity of assessment: 30-34 and credibility of assessment: 35-40. Descriptive statistics are included in Table 3. These data also include race, gender, GPA and grade level of the participants. For the criterion variable, scores on advancement portfolio reviews ranged between 53 and 245 with a mean score of 175. The sample consisted of 23 self-identified male, 26 female, and 9 non-binary students enrolled in the Bachelor of Fine Arts in Game Art program. One participant chose not to disclose gender identification. The sample included 29 white, 10 Hispanic, 10 Asian, and 5 two or more races, 2 non-resident alien, and 3 unknown. Participants included 29 sophomores, 25 juniors and 5 seniors. The mean GPA for the participants was 3.48.

Table 3

Descriptive Statistics

Group

N	*M*	*SD*	
SC	59	175	39.81
RA	59	2.19	1.42
GPA	59	3.48	.32
LEV	59	2.59	.65
EFF	59	3.61	.81
FA	59	3.34	.88
CON	59	3.37	.92
INT	59	3.32	.97
AUTH	59	3.24	.97
CRED	59	3.68	.98

Note. Predictor variables: perception of effects of assessment on learning (EFF), fairness of assessment (FA), conditions of assessment (CON), interpretation of scores (INT), authenticity of assessment (AUTH), and credibility of assessment (CRED); Criterion variable: advancement review score (SC).

Assumptions Testing

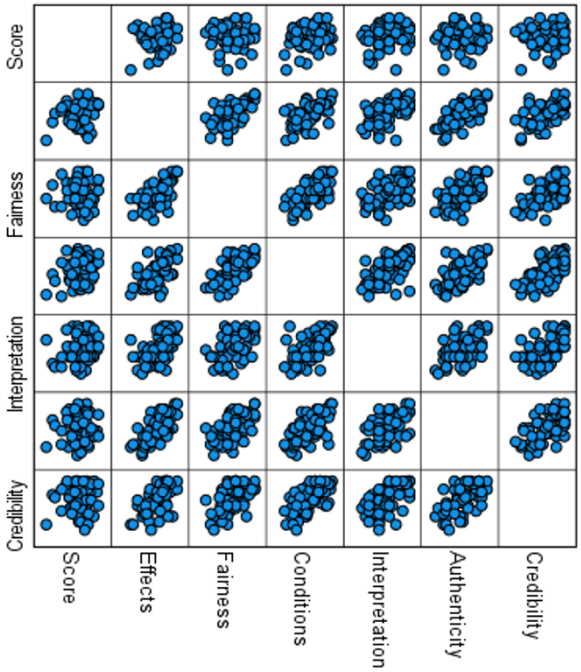
Three assumptions were required in this multiple regression analysis. A visual scanning of data was completed in order to identify any extreme bivariate outliers. A matrix scatter plot was then used to determine normality and multivariate normal distribution to determine collinearity of predictor variables and the criterion variable. Finally, the assumption of non-multivariate was tested by measuring the variance of inflation factors.

Data screening for this study included the implementation of SPSS to construct scatter plots to examine any extreme bivariate outliers. A matrix of 7 scatter plots were constructed between each pair of predictor variables (x, x) and the predictor variables (x) and the criterion variable (y). The data depicted by matrix scatter plot demonstrated no extreme bivariate outliers, therefore, the assumption of bivariate outliers is tenable.

The matrix scatter plot was inspected to identify linearity. Examination of these scatter plots suggests that relationships between all pairs of variables are reasonably linear and while there were some outliers, they were judged as insufficiently extreme to affect the results. The traditional "cigar shape" depicting clustering of data around a supposed line of best fit illustrate that the assumption of multivariate normal distribution is tenable. Figure 7 provides a visual image of the SPSS generated matrix scatter plot.

Figure 7

Scatterplot Matrix



In addition to constructing scatter plots to assess the assumption of multivariate normal distribution, the variance of inflation factor (VIF) was measured to test the assumption of non-multicollinearity. All VIF values appeared in acceptable range illustrating that the absence of multicollinearity was tenable (see Table 4).

Table 4

Collinearity of Statistic

Model	Tolerance	VIF
EFF	.40	2.53
FA	.47	2.13
CON	.38	2.66
INT	.45	2.24
AUTH	.40	2.50
CRED	.46	2.18

Note. Criterion Variable: Score on Advancement Review

Results

A multiple regression analysis was conducted to test the null hypothesis: there will be no significant predictive relationship between the criterion variable, student achievement on their advancement review portfolio assessment and the linear combination of predictor variables including *perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment,* and *credibility of assessment* for undergraduate game art students. The overall regression was statistically significant ($R^2 =$ .22, *F*

(6, 52) = 2.44, p = .04). The linear combination of predictor variables accounted for 22% of the variance in student achievement as measured by the advancement review portfolio scores.

The adjusted R^2 value accounts for useless independent variables to find the percentage of variation of the variable that are useful in affecting the dependent variable. The adjusted R^2 value for this model was .13 indicating that the predictor variable is significantly predictive of the criterion variable. Therefore, the null hypothesis was rejected. Results are presented in Tables 5 and 6.

Regression testing was applied to measure the effects of the six predictor variables and the one criterion variable. The results of the regression indicated that predictor variable *effects of assessment* on learning significantly predicted advancement review scores (β = .41, p = .04). *Fairness of assessment* was trending toward significance to predict scores (β = -32, p = .07). *Conditions of assessment* significantly predicted advancement review scores (β = .44, p = .03). *Interpretation of scores* did not significantly predict scores (β = .17, p = .29). *Authenticity of assessment* was trending toward significance to predict scores (β = -.35, p = .07), and *Credibility of assessment* did not significantly predict scores (β = -16, p = .36). Results are displayed in Table 7 below.

Table 5

Regression Model Results

Model	*R*	R^2	Adjusted R^2	Std. Error of the Estimate	Durbin Watson
1	.47	.22	.13	37.14	1.57

Note. Criterion Variable: Advancement Review Score (Constant); Predictor Variables: Perception of Effects of Assessment on Learning, Fairness of Assessment, Conditions of Assessment, Interpretation of Scores, Authenticity of Assessment, and Credibility of Assessment.

Table 6

ANOVA

Model	Sum of Squares	*df*	Mean Square	*F*	Sig.
Regression	20197.54	6	3366.26	2.44	.04 [b]
Model	Sum of Squares	*df*	Mean Square	*F*	Sig.
Residual	71720.26	52	1379.24		
Total	91917.90	58			

Note. Dependent Variable: Score; Predictors: (Constant), Credibility, Fairness, Interpretation, Authenticity, Effects, Conditions

Table 7

Regression Model Coefficients

Variable	β	t-stat	Sig.
EFF	.41	2.15	.04
FA	-.32	-1.87	.07
CON	.44	2.29	.03
INT	.17	1.06	.29
AUTH	-.35	-1.86	.07
CRED	-.16	-.92	.36

Note. Predictor variables: perception of effects of assessment on learning (EFF), fairness of assessment (FA), conditions of assessment (CON), interpretation of scores (INT), authenticity of assessment (AUTH), and credibility of assessment (CRED); Criterion variable: advancement review score (SC).

Multiple regression analysis results concluded the overall model was significant (R^2 = .22, $F(6, 52) = 2.44$, $p = .04$), therefore, the null hypothesis was rejected at the 95% confidence level. Two predictors (*effects of assessment* and *conditions of assessment*) were significant, two

(*fairness of assessment* and *authenticity of assessment*) were trending toward significance, and two (*interpretation of assessment* and *credibility of assessment*) were not significant. Cohen's f^2 was calculated to measure effect size in multiple regression analysis. The formula for Cohen's f^2 is $R^2 / (1 - R^2)$. The Cohen's f^2 for this model is .22 / .78 = .28. Cohen (1988) describes $f^2 \geq 0.02$, $f^2 \geq 0.15$, and $f^2 \geq 0.35$ represent small, medium, and large effect sizes, respectively. Therefore, the effect size for this study is medium, indicating the strength of the relationship between variables.

CHAPTER FIVE: CONCLUSIONS

Overview

This chapter examines the implications of the results of this quantitative, predictive correlational study of the relationship between student perception of assessment and student achievement on their advancement review portfolios. It also discusses conclusions based on these results. Data from undergraduate students enrolled in a Southern California Art and Design college collected from a survey were accessed to measure the perceptions of assessment. Achievement of learning for these students was measured using the scores of students' advancement portfolio reviews completed during the spring 2021, fall 2021, and spring 2022 semesters. This chapter will discuss results of the research, implications of the study results, limitations of this study, and recommendations for future research.

Discussion

The purpose of this quantitative, non-experimental predictive correlational study is to analyze the relationship between game art students' perceptions of the quality of assessment practices in higher education and their achievement of learning. The predictor variables for this study are perception of the following: *effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment* and *credibility of assessment*. The predictor variables address six factors identified in Gerritsen-van Leeuwenkamp et al.'s instrument (2019) Students' Perceptions of Assessment Quality Questionnaire (SPAQQ). Each of these factors are measured via specific questions comprising the survey.

The research question was designed to address the accuracy of the linear combination of *perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment*, and *credibility of assessment* for

undergraduate game art students in predicting student achievement on advancement portfolio review assessment. The null hypothesis stated that there will be no significant predictive relationship between the criterion variable, achievement on students' advancement portfolio review assessment and the linear combination of predictor variables including *perception of effects of assessment on learning, fairness of assessment, conditions of assessment, interpretation of scores, authenticity of assessment,* and *credibility of assessment* for undergraduate game art students. The researcher rejected the null hypothesis based on the results of multiple linear regression analysis. The results concluded the overall regression was statistically significant ($R^2 =$ .22, F (6, 52) = 2.44, p = .04). The regression model results of $R^2 = .22$ indicates that the effect size of students' perception of assessment on student achievement is medium. This signifies that 22% of the variance in student achievement of learning as measured by scores on portfolio reviews was explained by a linear combination of student perceptions of assessment.

The results of this study aligned with Gerritsen-van Leeuwenkamp's (2019) research. Gerritsen-van Leeuwenkamp (2019) also applied multiple linear regression analysis to measure the relationship between students' perception of assessment and their learning outcomes. When applying multiple linear regression analysis with all six of the same variables implemented in the current study, Gerritsen-van Leeuwenkamp (2019) found the relationship between students' perception of the *conditions of assessment* and their learning outcomes to be significant (p = .02). Gerritsen-van Leeuwenkamp's (2019) study was foundational for further research in students' perception of assessment and achievement of learning. The study promotes a student-centered approach to developing assessment practices with improved conditions to advance student achievement. Specifically, the study posits that focus on improvement should be considered specifically in assessment organization, faculty professionalism and construction of assessments.

Gerritsen-van Leeuwenkamp (2019) underscored a significant relationship between student perception of the *conditions of assessment* and student achievement. In addition to Gerritsen-van Leeuwenkamp's (2019) findings, this current research also found a significant relationship between student perceptions of *conditions of assessment* and their achievement of learning. This current research also discovered significant prediction potential with the variable *effects of assessment*. Two other predictor variables were trending toward significance: *fairness of assessment* and *authenticity of assessment.* This study advances Gerritsen-van Leeuwenkamp's (2019) research by demonstrating that more significant relationships exist with the other predictor variables, further illustrating the importance of understanding students' perceptions in the assessment process.

Results of this current study also align with findings from Kaur (2018) and Preston et. al. (2020). Kaur (2018) described the importance of understanding the student experience in assessment. Kaur's work posits that faculty can better design assessments if they understand students' perceptions of the process. Results of Preston et al. (2020) indicated a direct relationship between student effort and the type of assessment where only 6.5% of participants rated reflective writing as accurate assessment tools, while 8.2% indicated that essays, 8.4% mini-practical exams, and 50.8% key feature problems to be effective tools reflective of the learning effort. Short answer questions were rated by 46.2% and multiple station assessment tasks were rated by 31.6% of participants as an effective tool reflective of the learning effort. Preston et. al. (2020) also supported the connection between understanding students' perception of assessment and their achievement. This prior research supports the need for assessment practices to be authentic and supportive of student learning. This current study also demonstrates a connection between assessment practices and student learning. Advancing Kaur (2018) and

Preston et al.'s (2020) research, this current study provides evidence for researching a deeper analysis of the relationship between student learning and assessment.

As evidenced by the findings of past research, there is consistency in the results of studies examining the predictive relationship between assessment and student learning. This current research advances these studies supporting that a relationship exists between students' perception of assessment and their achievement. The current findings further develop past research by identifying specific areas where assessment practices should be improved in order to affect student learning.

Implications

Findings of this study identified students' perceptions of assessment significantly predicted student achievement on advancement review portfolio scores for game art students. Similarly, prior research underscored that an adverse response to assessment influences assessment results (Jones, et al., 2020; Preston et al., 2020; Wass, 2020). Other research (Gerritsen-van Leeuwenkamp, 2019) also highlighted a significant relationship between student perception of assessment and student achievement. The results of this study indicate a significant correlation between some of the facets and a trend toward a correlation between others. However, the variables *interpretation of assessment* and *credibility of assessment* were found to be non-significant predictor variables implying that students' perceptions of the meaning of test scores and their belief in assessment seem to be less important regarding their learning. While these two facets were not significantly predictive, the results of the linear combination of all predictors demonstrate that by understanding students' perceptions, faculty could influence their learning.

The results of this study imply that if assessment practices are designed to elicit more positive student perceptions, achievement of learning outcomes will improve. This could be accomplished by improving the assessment processes specifically in the areas identified in this research to be significant or trending toward significance. Results generated from this study demonstrate that *effects of assessment* and *conditions of assessment* significantly correlated with student achievement. Based on these results, Game Art faculty could evaluate the *effects of their assessments on learning* which represent how the advancement portfolio review influences both the process and progress of student learning. This could include effects on motivation, retention of competencies, confidence, preparation for future learning, clear feedback on strengths and weaknesses, as well as the value of the assessment for the student. Faculty could also carefully evaluate the *conditions of their assessments* such as the format or the faculty competency in administering the portfolio review. Faculty could implement this analysis of student perceptions to create strategies that improve assessment in relation to effects on learning and conditions of assessment. These strategies could involve providing consistent training for faculty including rubric norming and feedback expectations. Findings of this research also imply faculty might consider improvements of the portfolio review construction and organization. Faculty could consider seeking student feedback in designing assessments and the processes implemented to administer them to promote greater student motivation and self-regulation.

Applying a student-centered approach to assessment aligns with both Boud's (2000) and Deming's (1986; 2000) theories emphasizing improvement with a student-centered focus. This approach involves incorporating the concept of assessment for learning (AfL) which would necessitate the development of assessment processes that include students. Research supports that student engagement in their own learning supports the achievement of learning outcomes

(Klenowski, 2009; Wu et al., 2021). Research also suggests, assessments must be authentic, measuring knowledge and skills reflective of what students know, can do, and incorporated throughout and beyond their education (Ashford-Rowe et al., 2014).

Assessment for art educators is particularly complex due to assessment of the creation process and not just the product. In emerging visual art fields such as Game Art, there is often an intimate relationship between students and their work. This can create an emotional response to assessment feedback thus stifling creativity. Improvements to portfolio review assessments particularly for Game Art students should be considered per the results of this research. As no such research has been conducted previously, this study provides the basis for further research specific to visual arts students, specifically those in a game art genre.

Limitations

Limitations in research can be a threat to both internal and external validity. A limitation of this study is the sample only included 59 participants. This small sample size could undermine the internal and external validity of this study. The researcher made every effort to increase the sample size, but the number of students available in the population was severely limited. Furthermore, this study was conducted at only one college in one state impeding the generalizability of the results. It also focused on only one narrow content area which also impedes the generalizability of the results.

This research, despite controlled bias, was conducted by an administrator of the college in which the participants were enrolled. This could be a limitation if students' responses were influenced due to fear of their identity being compromised. Additionally, while the study was designed to include participants who had earned between 28 and 97 units, a few students actually had earned more units. Students with more credits could likely be advantaged on the assessment.

This study is also limited in that it did not account for the effects of confounding variables which may influence assessment results such as grade point average (GPA). Students maintaining a higher GPA might produce increased scores on advancement review portfolios despite their perceptions of the assessment process. Similarly, student results on assessment could be influenced by race, gender identity or first-generation status as these factors often influence achievement. These variables could easily be added as predictors in future studies.

Recommendations for Future Research

Assessment in higher education is critical to student success. Understanding students' perceptions can improve assessment practices (Gerritsen-van Leeuwenkamp et al., 2019: Jones et al., 2020: Kaur et al., 2017; Wass et al. 2020). However, a review of the literature identified no specific research pertaining to game art students' perception of assessment. Because of the complexity of assessment in the creative disciplines such as visual and performing arts as well as art and design programs, further research is needed to increase knowledge in the field. This knowledge can support art and design faculty in designing improved assessment practices to achieve better results. Recommendations include the following:

1. Conducting similar research with a higher sample size to ensure validity.
2. Further research on the relationship between student perception of assessment and student achievement in other creative disciplines such as animation, music, and entertainment design among others.
3. Implementing qualitative studies to provide greater detail on students' perceptions.
4. Repeating this study after assessments have been improved.
5. Broadening the research to include multiple art and design colleges.

6. Conducting similar research including other predictor variables such as GPA, first race or even gender identity that may affect assessment results. First generation students may also be included.

The purpose of this study was to analyze the relationship between game art students' perceptions of the quality of assessment practices in higher education and their achievement of learning. The research was guided by the following four established theories pertaining to assessment: Boud's (2000) theory of sustainable assessment, Deming's (1986; 2000) theory of total quality management, Pearse's theoretical framework of three paradigms (1992), and Bloom's learning taxonomy (1956). The theoretical connection between students' perception of assessment and student achievement of learning was based on a literature review relating to assessment in higher education. The literature review underscored the purpose, influence, and students' perception of assessment practices. It also examined assessment practices specific to the field of game art education. This review identified much research supporting the potential connection between assessment and achievement. Replicating another study, this research focused specifically on game art students due to personal interest of the researcher in the field of visual creative arts.

The study included participants from a small Southern California art and design college where the researcher is employed. The study administered a survey to collect data on students' perception of assessment of their advancement portfolio reviews. This research replicated another study which sampled undergraduate students from a university of applied sciences in the Netherlands. That study found only one correlation between the predictor variable, *conditions of assessment,* and student achievement. The current research identified significant correlations with the criterion between two of the predictor variables: *effects of assessment* and *conditions of*

assessment. The current research also discovered two predictor variables to be trending toward significance in reference to the criterion: *fairness of assessment* and *authenticity of assessment.* While these predictor variables correlated with achievement, *interpretation of assessment* and *credibility of assessment* did not. However, this does not imply that student perceptions of assessment in these areas are not important.

This study and past research indicate improvement in assessment practices can lead to improvement in student achievement of learning. Findings also support the need to incorporate students into the assessment process, considering their perceptions to improve practices. Future research should consider how student achievement in other visual arts programs are influenced by assessment practices.

References

Alekseeva, L. L. (2018). Assessing the quality of art education in present-day schools. *Calitatea, 19*(164), 74-79.

Altizer, R., Fullerton, T., Lawley, E., Phelps, A., & and Steinkuehler, C. (2017, August 15). *Game design & development curriculum: History & future directions* [Presentation]. Foundations of Digital Games, Hyannis, MA. https://fdg2017.sched.com/event/BMBp/game-design-development-curriculum-history-and-future-directions.

Amodt, P. O., Frølich, N., & Stensaker, B. (2018). Learning outcomes - A useful tool in quality assurance? Views from academic staff. *Studies in Higher Education, 43*(4), 614-624. doi:10.1080/03075079.2016.1185776

Andrade, H., Hefferen, J., & Palma, M. (2014). Formative assessment in the visual arts. *Art Education (Reston), 67*(1), 34-40. https://doi.org/10.1080/00043125.2014.11519256

Ariovich, L., Bral, C., Gregg, P. L., Gulliford, M., & Morrow, J. A. (2019). The assessment profession in higher education: A snapshot of perceptions, roles, and activities. *Assessment Update, 31*(3), 10-12. doi:10.1002/au.30175

Arneson, J. B., & Offerdahl, E. G. (2018). Visual literacy in bloom: Using bloom's taxonomy to support visual learning skills. *CBE Life Sciences Education, 17*(1), ar7. https://doi.org/10.1187/cbe.17-08-0178

Assessment Reform Group (ARG). (1999). *Assessment for learning: Beyond the black box*. Cambridge, UK: Cambridge University, School of Education.

Assessment Reform Group. (2002). *Assessment for learning: 10 principles*. Retrieved from http://www.hkeaa.edu.hk/DocLibrary/SBA/HKDSE/Eng_DVD/doc/Afl_prin

ciples.pdf

Ashford-Rowe, K., Herrington, J., & Brown, C. (2014). Establishing the critical elements that determine authentic assessment. *Assessment and Evaluation in Higher Education, 39*(2), 205-222. https://doi.org/10.1080/02602938.2013.819566

Association of American Colleges & Universities. (n.d.) *VALUE: What is VALUE*? https://www.aacu.org/value

Black, P., & Wiliam, D. (1998). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan, 80*(2), 139-148.

Bloom, B.S. (1956). *Taxonomy of educational objectives – The classification of educational goals – IHandbook 1: Cognitive domain.* London: Longman.

Blumenstyk, G. August 7, 2015. What the public wants from accreditation. *The Chronicle of Higher Education*. https://www.chronicle.com/article/what-the-public-wants-from-accreditation/

Blythman M., Blair, B. and Orr, S. (2008) *Critiquing the Crit: Student guide.* Available at: www.adm.heacademy.ac.uk/library/files/adm. . ./crit-student-guide.pdf

Bodle, K. A., Malin, M., & Wynhoven, A. (2017). Students' experience toward ePortfolios as a reflective assessment tool in a dual mode indigenous business course. *Accounting Research Journal, 30*(3), 333-350. https://doi.org/10.1108/ARJ-06-2015-0089

Bolat, Y., & Karakuş, M. (2017). Design implementation and authentic assessment of a unit according to Concept-Based Interdisciplinary Approach. *International Electronic Journal of Elementary Education, 10*(1), 37-48. http://dx.doi.org/10.26822/iejee.2017131885

Boud, D. (2000). Sustainable assessment: Rethinking assessment for the learning society. *Studies in Continuing Education, 22*(2), 151-167. https://doi.org/10.1080/713695728

Boud, D., Dawson, P., Bearman, M., Bennett, S., Joughin, G., & Molloy, E. (2016;2018). Reframing assessment research: Through a practice perspective. *Studies in Higher Education (Dorchester-on-Thames), 43*(7), 1107-1118. doi:10.1080/03075079.2016.1202913

Brewer, T. M. (2008). Developing a bundled visual arts assessment model. *Visual Arts Research, 3*4(1), 63-74.

Brown, G. & Hirschfeld, G. (2008) Students' conceptions of assessment: Links to outcomes, *Assessment in Education: Principles, Policy & Practice, 15*(1), 3-17, DOI: 10.1080/09695940701876003

Brumwell, S., Deller, F., & MacFarlane, A. (2017). Why measurement matters: The learning outcomes approach – a case study from Canada. *Journal of Higher Education in Africa / Revue De L'enseignement Supérieur En Afrique, 15*(1), 5-22. www.jstor.org/stable/90016697

Bryan, C., & Clegg, K. (2019). *Innovative assessment in higher education: A handbook for academic practitioners (Second ed.).* London: Routledge.

Carson, J. T. (2019). Blueprints of distress?: Why quality assurance frameworks and disciplinary education cannot sustain a 21st-century education. *Teaching in Higher Education, 24*(8), 1014-1023. doi:10.1080/13562517.2019.1602762

Chandio, M. T., Pandhiani, S. M., & Iqbal, S. (2016). Bloom's taxonomy: Improving assessment and teaching-learning process. *Journal of Education and Educational Development, 3*(2), 203-221. https://doi.org/10.22555/joeed.v3i2.1034

Clark, I. (2012). Formative assessment: A systematic and artistic process of instruction for supporting school and lifelong learning. *Canadian Journal of Education, 35*(2), 24-40.

Clarke, J. L., & Boud, D. (2018). Refocusing portfolio assessment: Curating for feedback and portrayal. *Innovations in Education and Teaching International, 55*(4), 479-486. https://doi.org/10.1080/14703297.2016.1250664

Cohen J. E. (1988). *Statistical power analysis for the behavioral sciences.* Lawrence Erlbaum Associates, Inc.

Council for Higher Education Accreditation. (n.d.) *Accreditation & Recognition.* https://www.chea.org/about-accreditation

Cox, B. E., Reason, R. D., Tobolowsky, B. F., Brower, R. L., Patterson, S., Luczyk, S., & Roberts, K. (2017). Lip service or actionable insights? Linking student experiences to institutional assessment and data-driven decision making in higher education. *The Journal of Higher Education 88*(6), 835-862. https://doi.org/10.1080/00221546.2016.1272320

Cummings, R., Maddux, C. D., & Richmond, A. (2008). Curriculum-embedded performance assessment in higher education: Maximum efficiency and minimum disruption. *Assessment and Evaluation in Higher Education, 33*(6), 599-605. https://doi.org/10.1080/02602930701773067

Deluca, C. (2010). The capacity of assessment in arts education. *Encounters in Theory and History of Education, 11*(3-12). Retrieved from http://ojs.library.queensu.ca /index.php/encounters/article/view/2526/3157

Deming, W. E. (2000). *Out of the crisis* (First MIT Press ed.). Mass: MIT Press.

Deming, W. E. (1993). Leading quality transformations. *Executive Excellence, 10*(5), 4. http://ezproxy.liberty.edu/login?qurl=https%3A%2F%2Fwww.proquest.com%2Ftrade-journals%2Fleading-quality-transformations%2Fdocview%2F204628867%2Fse-

2%3Faccountid%3D12085

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, mail, and mixed-mode surveys: The tailored design method* (4th ed.). Wiley.

Driscoll, A., & Wood, S. (2011). *Developing outcomes-based assessment for learner-centered education: A faculty introduction.* Stylus Publishing.

Eaton, J. (2015). *An overview of U.S. accreditation*. Washington DC: Council for Higher Education Accreditation.

Eisner, E. W. (2002). What can education learn from the arts about the practice of education? *Journal of Curriculum and Supervision, 18*(1), 4.

Elkins, J. 2001. *Why art cannot be taught: A handbook for art students*. Chicago, IL: University of Illinois Press.

Envato, (2017, October 30) A brief history of video game design. https://envato.com/blog/history-video-game-design/

Ewell, P. (2010). Twenty years of quality assurance in higher education: What's happened and what's different? *Quality in Higher Education, 16*(2), 173-175. doi:10.1080/13538322.2010.485728

Feuerstein, A. (2015). Rituals of verification: Department chairs and the dominant discourse of assessment in higher education. *Journal of Higher Education Theory and Practice, 15*(6), 38-51.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction* (8th ed.). Allyn & Bacon. ISBN: 9780205488490.

GameDesigning. 2D video game art: history, styles, techniques, and tutorials to get you started (n.d.) https://www.gamedesigning.org/learn/2d-game-art/

Gerritsen-van Leeuwenkamp, K. J., Joosten-ten Brinke, D., & Kester, L. (2018). Developing questionnaires to measure students' expectations and perceptions of assessment quality, *Cogent Education, 5*:1, DOI: 10.1080/2331186X.2018.1464425

Gerritsen-van Leeuwenkamp, K. J., Joosten-ten Brinke, D., & Kester, L. (2019). Students' perceptions of assessment quality related to their learning approaches and learning outcomes. *Studies in Educational Evaluation, 63*(72-82). doi:10.1016/j.stueduc.2019.07.005

González, M., Jareño, F., & López, R. (2015). Impact of students' behavior on continuous assessment in higher education. *Innovation 28*(4), 498-507. doi:10.1080/13511610.2015.1060882

Ghosh, S., Brooks, B., Ranmuthugala, D., & Bowles, M. (2020). Authentic versus traditional assessment: An empirical study investigating the difference in seafarer students' academic achievement. *Journal of Navigation, 73*(4), 797-812. https://doi.org/10.1017/S0373463319000894

Graham, M. (2019). Assessment in the visual arts: Challenges and possibilities. *Arts Education Policy Review, 120*(3), 175-183. https://doi.org/10.1080/10632913.2019.1579131

Granberg, C., Palm, T., & Palmberg, B. (2021). A case study of a formative assessment practice and the effects on students' self-regulated learning. *Studies in Educational Evaluation, 68*, 100955. https://doi.org/10.1016/j.stueduc.2020.100955

Green, S. B., & Salkind, N. J. (2017). *Using SPSS for Windows and Macintosh: Analyzing and understanding the data.* Pearson.

Goertzen, B. J. (2012). Assessment adrift: Review of the current state of assessment of academically based leadership education programs. *Journal of Leadership Studies, 6*(3),

55-60. https://doi.org/10.1002/jls.21257

Guzzomi, A., Male, S., & Miller, K. (2017). Students' responses to authentic assessment designed to develop commitment to performing at their best, *European Journal of Engineering Education, 42*(3), 219-240, doi: 10.1080/03043797.2015.1121465

Haugnes, N., Springborg, M., Holmgren, H., & Project Muse. (2018). *Meaningful grading: A guide for faculty in the arts* (First ed.). West Virginia University Press.

Henderson, M., Ryan, T. & Phillips, M. (2019). The challenges of feedback in higher education. *Assessment & Evaluation in Higher Education 44* (8), 1237–1252. doi:10.1080/02602938.2019.1599815

Heritage, M., & Harrison, C. A. (2019). *The power of assessment for learning: Twenty years of research and practice in UK and US classrooms* (1st ed.). SAGE Publications.

Higher Education Video Game Alliance. (2015). *Our state of play: Higher education video game alliance survey 2014-15*. http://higheredgames.org/wpcontent/themes/hevga_theme/assets/2015_HEVGA_Survey_Results.pdf

Holt, M. (1993). Deming on education: A view from the seminar. *Phi Delta Kappan, 75*(4), 329-330.

Hope, S., & Wait, M. (2013). Assessment on our own terms. *Arts Education Policy Review, 114*(1), 2-12. https://doi.org/10.1080/10632913.2013.744235

Hoey, J., & Ferguson, J. (2015). *Reframing quality assurance in creative disciplines*. Common Ground Publishing.

Holmwood, C. (2019). Assessing the arts, and student response, within the creative expressive therapies in higher education. In J. Taylor, & C. Holmwood (Eds.), (1st ed., pp. 113-126).

Routledge. https://doi.org/10.4324/9781315142142-12

Kahn, S., Hundley, S. P., Banta, T. W., & Dyson, K. (2019). *Trends in assessment: ideas, opportunities, and issues for higher education* (First edition.). Stylus Publishing.

Jankowski, N. A., Timmer, J. D., Kinzie, J., & Kuh, G. D. (2018, January). Assessment that matters: Trending toward practices that document authentic student learning. Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment (NILOA).

Jones, E., Priestley, M., Brewster, L., Wilbraham, S. J., Hughes, G., & Spanner, L. (2020). Student wellbeing and assessment in higher education: The balancing act. *Assessment and Evaluation in Higher Education*, 1-13. doi:10.1080/02602938.2020.1782344

Joughin, G. 2009. Assessment, learning and judgement in higher education: A critical review. In Assessment, Learning and Judgement in Higher Education, edited by G. Joughin, 13–27. Dordrecht: Springer.

Kanwar, A., Mohee, R., Carr, A., Ortlieb, K., & Sukon, K. (2019). A neo-institutionalist approach to understanding drivers of quality assurance in ODL: The case of the open university of Mauritius. *International Review of Research in Open and Distance Learning, 20*(4), 79-98. doi:10.19173/irrodl.v20i4.4117

Kaur, A., Noman, M., & Awang-Hashim, R. (2018). The role of goal orientations in students' perceptions of classroom assessment in higher education. *Assessment and Evaluation in Higher Education, 43*(3), 461-472. doi:10.1080/02602938.2017.1359818

Kim, H. K. (2016). Course-embedded assessment in Korean nursing baccalaureate education. *Korean Journal of Medical Education, 28*(3), 295-303. https://doi.org/10.3946/kjme.2016.36

Klenowski, V. (2009). Assessment for learning revisited: An Asia-pacific perspective. *Assessment in Education: Principles, Policy & Practice, 16*(3), 263-268. https://doi.org/10.1080/09695940903319646

Krathwohl, D. R. (2002). A revision of Bloom's Taxonomy: An overview. *Theory into Practice, 41*(4), 212-218. https://doi.org/10.1207/s15430421tip4104_2

Kuh, G. D., & Ewell, P. T. (2010). The state of learning outcomes assessment in the United States. *Higher Education Management and Policy, 22*(1), 9.

Kyaruzi, F., Strijbos, J., Ufer, S. & Brown, G. (2019) Students' formative assessment perceptions, feedback use and mathematics performance in secondary schools in Tanzania, *Assessment in Education: Principles, Policy & Practice, 26*(3), 278-302, doi: 10.1080/0969594X.2019.1593103

Laguna College of Art and Design. (2020). *LCAD Student Handbook 2020-2021*. https://online.anyflip.com/imdo/ggan/mobile/index.html

Laguna College of Art and Design. (2021). *Game Art Department Advancement Review Rubric.*

Laguna College of Art and Design. (2022). *Course Requirements.* https://www.lcad.edu/sites/default/files/ga-cr-22-23_bg.pdf

Laguna College of Art and Design, (2022). *Program Overview*. https://www.lcad.edu/game-art/program/program-overview

Leaderman, D. & Fain, P. (n.d.) The higher education president. *Inside Higher Ed*. https://www.insidehighered.com/news/2017/01/19/assessing-president-obamas-far-reaching-impact-higher-education

Lilly, T., & Cooper, R. (2021). Getting to Eportfolios Through Assessment: A Process Model for Integrating Eportfolio Pedagogical Concepts Through Training for Program Assessment.

Journal of Higher Education Theory and Practice, 21(7), 44-55. http://ezproxy.liberty.edu/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Fgetting-eportfolios-through-assessment-process%2Fdocview%2F2572620762%2Fse-2%3Faccountid%3D12085

Lohr, S. (2015). Red beads and profound knowledge: Deming and quality of education. *Education Policy Analysis Archives, 23,* 80. https://doi.org/10.14507/epaa.v23.1972

Long, S., Rodriguez, C., St-Onge, C., Tellier, P., Torabi, N., & Young, M. (2021). Factors affecting perceived credibility of assessment in medical education: A scoping review. *Advances in Health Sciences Education: Theory and Practice*, https://doi.org/10.1007/s10459-021-10071-w

Lucander, H., & Christersson, C. (2020). Engagement for quality development in higher education: A process for quality assurance of assessment. *Quality in Higher Education*, 26(2), 135-155. doi:10.1080/13538322.2020.1761008

Lynam, S., & Cachia, M. (2018). Students' perceptions of the role of assessments at higher education. *Assessment and Evaluation in Higher Education 23* (2):223–234. doi:10.1080/02602938.2017.1329928

Medland, E. (2014; 2016). Assessment in higher education: Drivers, barriers and directions for change in the UK. *Assessment and Evaluation in Higher Education, 41*(1), 81-96. doi:10.1080/02602938.2014.982072

Melguizo, T., & Coates, H. (2017). The value of assessing higher education student learning outcomes. *AERA Open, 3*(3), 233285841771541. doi:10.1177/2332858417715417

Mendez, S. L., Ellis, N. F., & Calhoun, L. (2020). Experience matters, but so do limited resources: Faculty perceptions of their self-efficacy and controllability in assessing

student learning. *Journal of Higher Education Theory and Practice,* 20(8), 86-97. http://ezproxy.liberty.edu/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Fexperience-matters-so-do-limited-resources%2Fdocview%2F2465482567%2Fse-2%3Faccountid%3D12085

Mitchell, M.C., 2016, Embracing accountability and continuous quality improvement in higher education. *Young Children*, 70(5), 56–58.

Minelgaitė, I., Nedzinskaitė-Mačiūnienė, R., Kristinsson, K., & Gudjonsson, S. (2019). 'The emperor is naked!': Exposing (in) efficiency of self- assessment and group – assessment in higher education. *Pedagogika 134*(2), 45-60.

Mnguni, L., Schönborn, K., Anderson, T. (2016). Assessment of visualisation skills in biochemistry students. *South African Journal of Science, 112*(Number 9/10), 63. https://doi.org/10.17159/sajs.2016/20150412

Moen, R. D., & Norman, C. L. (2010). Circling back. *Quality Progress, 43*(11), 22.

Montano, C. B., Hunt, M. D., & Boudreaux, L. (2005). Improving the quality of student advising in higher education - A case study. *Total Quality Management & Business Excellence, 16*(10), 1103-1125. https://doi.org/10.1080/14783360500235843

Morrell, L. J. (2021). Iterated assessment and feedback improves student outcomes. *Studies in Higher Education (Dorchester-on-Thames), 46*(3), 485-496. https://doi.org/10.1080/03075079.2019.1643301

Mulliner, E., & Tucker, M. (2017). Feedback on feedback practice: Perceptions of students and academics. *Assessment & Evaluation in Higher Education 42*(2), 266–288. doi:10.1080/02602938.2015.1103365

National Association of Schools of Art and Design (2009). *Assessment on our own terms.*

NASAD.

Nieminen, J. H., & Tuohilampi, L. (2020). Finally studying for myself – examining student agency in summative and formative self-assessment models. *Assessment and Evaluation in Higher Education, 45*(7), 1-15. doi:10.1080/02602938.2020.1720595

Nguyen, T. & Walker, M. (2016) Sustainable assessment for lifelong learning. *Assessment & Evaluation in Higher Education, 41*:1, 97-111, DOI: 10.1080/02602938.2014.985632

Offerdahl, E. G., McConnell, M., & Boyer, J. (2018). Can I have your recipe? using a fidelity of implementation (FOI) framework to identify the key ingredients of formative assessment for learning. *CBE Life Sciences Education, 17*(4), es16-es16. https://doi.org/10.1187/cbe.18-02-0029

Orr, S., & Bloxham, S. (2013). Making judgements about students making work: Lecturers' assessment practices in art and design. *Arts and Humanities in Higher Education, 12*(2-3), 234-253. https://doi.org/10.1177/1474022212467605

Pavlenko, O. (2020). Implementation of national higher education standard in electronics: Students' perceptions of learning outcomes. *EUREKA: Social and Humanities, 5*, 43-49. doi:10.21303/2504-5571.2020.001439

Pearse, H. (1983). Brother, can you spare a paradigm? the theory beneath the practice. Studies in Art Education, 24(3), 158-163. https://doi.org/10.1080/00393541.1983.11650337

Pearse, H. (1992). Beyond paradigms: Art education theory and practice in a postparadigmatic world. *Studies in Art Education, 33*(4), 244-252. https://doi.org/10.2307/1320669

Preston, R., Gratani, M., Owens, K., Roche, P., Zimanyi, M., & Malau-Aduli, B. (2020). Exploring the impact of assessment on medical students' learning. *Assessment and Evaluation in Higher Education, 45*(1), 109-124. doi:10.1080/02602938.2019.1614145

Rasooli, A., Zandi, H., & DeLuca, C. (2018). Re-conceptualizing classroom assessment fairness: A systematic meta-ethnography of assessment literature and beyond. *Studies in Educational Evaluation, 56*, 164-181. https://doi.org/10.1016/j.stueduc.2017.12.008

Redmond, R., Curtis, E., Noone, T., & Keenan, P. (2008). Quality in higher education: The contribution of Edward Deming's principles. *International Journal of Educational Management, 22*(5), 432-441. https://doi.org/10.1108/09513540810883168

Rhodes, T. (2016). Assessment: Growing up is a many-splendored thing. *Journal of Assessment and Institutional Effectiveness, 5*(2), 101-116. doi:10.5325/jasseinsteffe.5.2.0101

Romero, B. (2016, February 16). Are games art? [Video]. TED Conferences. https://www.youtube.com/watch?v=L5sBdR4-GGM

Rust, C. (2016). The impact of assessment on student learning. *Active Learning in Higher Education, 3*(2), 145-158. doi:10.1177/1469787402003002004

Segers, M., Gijbels, D., & Thurlings, M. (2008). The relationship between students' perceptions of portfolio assessment practice and their approaches to learning. Educational Studies, 34(1), 35-44. https://doi.org/10.1080/03055690701785269

Serrano, M. M., O'Brien, M., Roberts, K., & Whyte, D. (2017; 2018;). Critical pedagogy and assessment in higher education: The ideal of 'authenticity' in learning. *Active Learning in Higher Education*, *19*(1), 9-21. doi:10.1177/1469787417723244

Schultz, M., Young, K., Gunning, T. K., & Harvey, M. L. (2021). Defining and measuring authentic assessment: A case study in the context of tertiary science. *Assessment and Evaluation in Higher Education, 1-18*. https://doi.org/10.1080/02602938.2021.1887811

Scott, D. (2018). Academic assessment in the arts: Introductory thoughts and models for successful implementation. *Journal of Performing Arts Leadership in Higher Education, 9*, 26-35.

Shavelson, R. J., Domingue, B. W., Mariño, J. P., Molina Mantilla, A., Morales Forero, A., & Wiley, E. E. (2016). On the practices and challenges of measuring higher education value added: The case of Colombia. *Assessment & Evaluation in Higher Education: Assessing Student Learning Outcomes in Higher Education: Challenges and International Perspectives, 41*(5), 695-720. doi:10.1080/02602938.2016.1168772

Shavelson, R. 2007. *A brief history of student learning assessment: how we got where we are and a proposal for where to go next*. Association of American Colleges and Universities.

Smith, R. (2021). W. Edwards Deming, an influential statistician. *Research Technology Management, 64(*5), 58-60. https://doi.org/10.1080/08956308.2021.1949850

Snepvangers, K., Thomson, P., & Harris, A. M. (2018). *Creativity policy, partnerships and practice in education.* Cham, Switzerland: Palgrave Macmillan.

Sotiriadou, P., Logan, D., Daly, A., & Guest, R. (2020). The role of authentic assessment to preserve academic integrity and promote skill development and employability. *Studies in Higher Education (Dorchester-on-Thames), 45*(11), 2132-2148. https://doi.org/10.1080/03075079.2019.1582015

Stables, K. (2017). *Assessment in technology education.* Springer International Publishing. https://doi.org/10.1007/978-3-319-44687-5_73

Stensaasen, S. (1995). The application of Deming's theory of total quality management to achieve continuous improvements in education. *Total Quality Management, 6*(5), 579-592. doi:10.1080/09544129550035233

Stevens, D. B. (2013). Singing the body electric: Using eportfolios to integrate teaching, learning and assessment. *Journal of Performing Arts Leadership in Higher Education, 4*, 32-58.

Stratford, M. July 28, 2015. The complexity of accountability. *Inside Higher Ed*. https://www.insidehighered.com/news/2015/07/28/renewed-obama-push-higher-ed-accountability-echoes-entrenched-politics

Suskie, L. (2016). How can we address ongoing accreditation challenges? *Assessment Update, 28*(4), 3-14. doi:10.1002/au.30063

Suskie, L. A. (2018). *Assessing student learning: A common sense guide* (Third edition.). Jossey-Bass.

Tavares, O., Sin, C., Videira, P., & Amaral, A. (2016; 2017). Academics' perceptions of the impact of internal quality assurance on teaching and learning. *Assessment and Evaluation in Higher Education, 42*(8), 1293-1305. doi:10.1080/02602938.2016.1262326

The W. Edwards Deming Institute. *Deming the man*. https://deming.org/about-us/our-story/

The Secretary of Education's Commission on the Future of Higher Education. (2006). *A test of leadership: Charting the future of U.S. higher education.* A report of the commission appointed by Secretary of Education Margaret Spellings. Washington, DC: U.S. Department of Education https://www2.ed.gov/about/bdscomm/list/hiedfuture/reports/final-report.pdf

Unbound Visual Arts (n.d.) What is visual arts? https://www.unboundvisualarts.org/what-is-visual-art/

van der Vleuten, C., Sluijsmans, D., & Joosten-ten Brinke, D. (2016). *Competence assessment as learner support in education*. Springer International Publishing. https://doi.org/10.1007/978-3-319-41713-4_28

Vu, T. T., & Dall'Alba, G. (2014). Authentic assessment for student learning: An ontological conceptualisation. *Educational Philosophy and Theory, 46*(7), 778-791. https://doi.org/10.1080/00131857.2013.795110

Villarroel, V., Bloxham, S., Bruna, D., Bruna, C., & Herrera-Seda, C. (2018). Authentic assessment: Creating a blueprint for course design. *Assessment and Evaluation in Higher Education, 43*(5), 840-854. https://doi.org/10.1080/02602938.2017.1412396

Wanner, T., & Palmer, E. (2018). Formative self-and peer assessment for improved student learning: The crucial factors of design, teacher participation and feedback. *Assessment and Evaluation in Higher Education, 43*(7), 1032-1047. https://doi.org/10.1080/02602938.2018.1427698

Warner, R. M. (2013). *Applied statistics: From bivariate through multivariate techniques.* Sage Publications.

Wass, R., Timmermans, J., Harland, T., & McLean, A. (2018; 2020). Annoyance and frustration: Emotional responses to being assessed in higher education. *Active Learning in Higher Education, 21*(3), 146978741876246-201. doi:10.1177/1469787418762462

Watering, G. v. d., Gijbels, D., Dochy, F., & van der Rijt, J. (2008). Students' assessment preferences, perceptions of assessment and their relationships to study results. *Higher Education, 56*(6), 645-658. https://doi.org/10.1007/s10734-008-9116-6

WePC. *Video game industry statistics, trends and data in 2021*. (2021). https://www.wepc.com/news/video-game-statistics/

Wheelan, B. & Elgart, M. May 25, 2016. Let accreditors do what does the most good for students. *The Chronicle of Higher Education*. https://www.chronicle.com/article/let-accreditors-do-what-does-the-most-good-for-students/?cid=gen_sign_in

Williams, A. (2017). History of digital games: Developments in art, design and interaction (1st ed.). *Taylor & Francis.* https://doi.org/10.1201/9781315715377

Wools, S., Sanders, P., & Eggen, T. (2010). Evaluation of validity and validation by means of the argument-based approach. *Evaluation of Validity and Validation by Means of the Argument-based Approach*, 1000-1020.

Wools, S. (2015) *All about validity. An evaluation system for the quality of educational assessment.* Published doctoral dissertation. https://doi-org.ezproxy.liberty.edu/10.13140/RG.2.1.3201.3288

Wu, X., Zhang, L. J., & Dixon, H. R. (2021). Implementing assessment for learning (AfL) in Chinese university EFL classes: Teachers' values and practices. *System* (Linköping), 101https://doi.org/10.1016/j.system.2021.102589

Yancey, K. B. (2009). Electronic portfolios a decade into the twenty-first century: What we know, what we need to know. *Peer Review, 11*(1), 28-32. http://ezproxy.liberty.edu/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Felectronic-portfolios-decade-into-twenty-first%2Fdocview%2F216597119%2Fse-2%3Faccountid%3D12085

Young, D. G. (2018). Outcomes assessment and sophomore programs: How assessment as organizational learning can improve institutional integrity. *New Directions for Higher Education, 2018*(183), 47-57. doi:10.1002/he.20292

Zlatkin-Troitschanskaia, O., Shavelson, R. J., & Pant, H. A. (2018). Assessment of learning outcomes in higher education: International comparisons and perspectives. In C. Secolsky, & D. B. Denison (Eds.), (2nd ed., pp. 686-698). Routledge. https://doi.org/10.4324/9781315709307-54

Zupančič, T. (2020). The creative artistic portfolio and reporting by art education students on their student teaching. *Revija Za Elementarno Izobraževanje, 13*(1), 19-40. https://doi.org/10.18690/rei.13.1.19-40.202

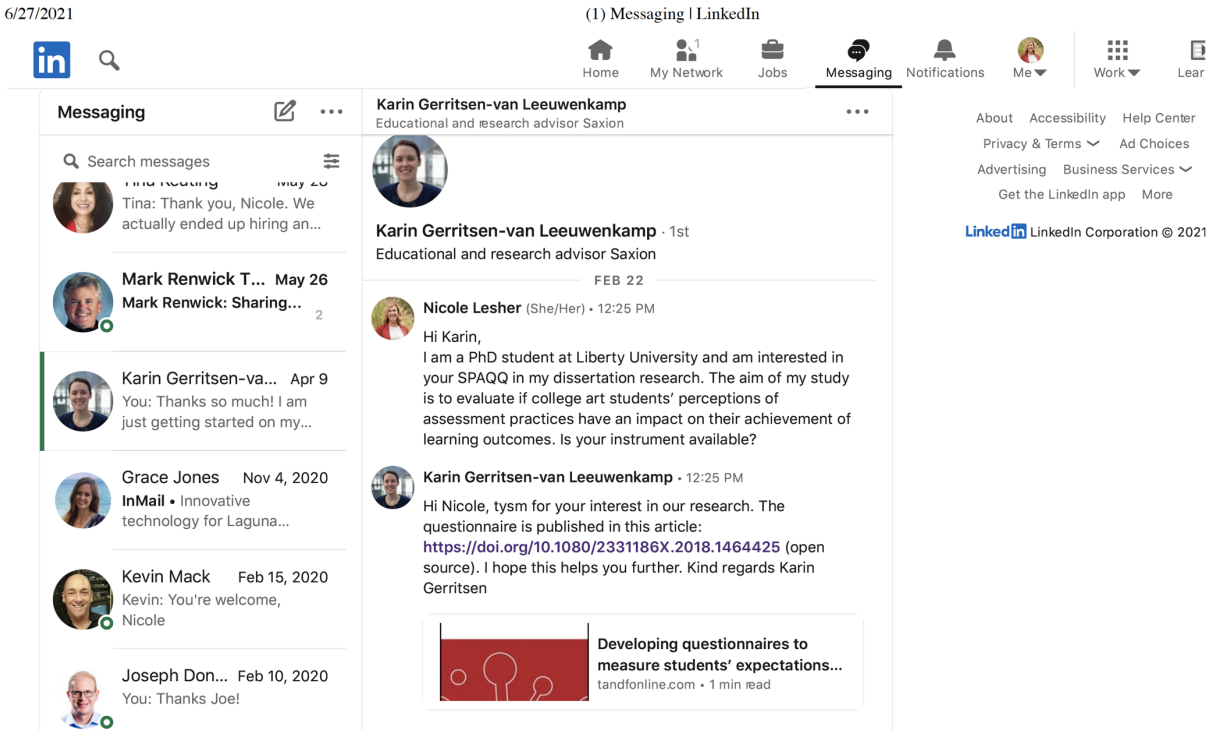
APPENDICES

Appendix A SPAQQ Instrument

1. Testing and assessment have a positive effect on my learning.
2. Testing and assessment add value to the time I have spent on the work done.
3. Testing and assessment are valuable instances of learning in their own right.
4. Testing and assessment motivate me to continue learning.
5. Testing and assessment help me to navigate my own learning process.
6. Testing and assessment are geared towards the retention of my competencies in the longer run.
7. Testing and assessment prepare me well for future learning activities.
8. Testing and assessment give me the confidence to continue learning.
9. The tests are challenging.
10. When I get feedback on tests it shows clearly what I have not yet mastered.
11. When I get feedback on tests it shows clearly what I have already mastered.
12. The tests correspond with the learning targets.
13. Testing and assessment are the same for all students in my year.
14. Testing and assessment are fair.
15. Testing and assessment can be done in the time given.
16. The difficulty of testing and assessment concur with the level of my education.
17. The tests and assessments are organized well.
18. Tests have been spread out evenly during the periods set for testing in the year of study.
19. When I get feedback on my tests, I will receive it in time.
20. The team of teachers in my educational program are accomplished in testing and assessment.
21. All tests feature correct language.
22. During testing and assessments there are no disturbing external factors, such as fraudulent behavior.
23. Whether I pass or fail is based correctly on the score of a test I have taken.
24. Tests have been constructed with care.
25. My scores on tests reflect the extent to which I have mastered the subject.
26. My scores on various tests on the same topic are comparable.
27. I would score the same for a test if different questions or tasks about the same subject were presented to me.
28. I would get more or less the same score on a test if I took the test for a second time (supposing my understanding of the subject matter has remained the same).
29. Testing and assessment correspond with the activities I will have to perform in my future occupation.
30. I understand testing and assessment.
31. The circumstances in which I am tested or assessed are similar to the working conditions of my future profession.

32. Testing and assessment unveil my thinking processes, for instance when I am asked to underpin certain choices.
33. I need the competences I require to pass my tests in other (professional) situations as well.
34. I agree with the manner in which I am examined.
35. The teachers use the results of the tests and assessments to adjust the teaching.
36. Judgements are made independently of the persons who rate me.
37. Assessments are made independently of the situations I am assessed in.
38. I trust testing and assessment in my educational program to be of good quality.
39. I get actively involved in testing and assessment in my educational program.

Appendix B Permission to use SPAQQ



Appendix C Advancement Portfolio Review Instructions

GAME ART ADVANCEMENT REVIEW

Directions for Creation + Submission

DUPLICATE the Advancement Review template from the Advancement Review folder and move the copy to your own Drive.

Follow the description on each page and fill the document with examples of your work. To see the requirements per slide, view speaker notes.

Make sure you are composing your layouts - sloppy presentations will lose points.

At the end of the document is a slide for additional art to show off what you are most interested in. You may add up to 4 additional slides, if needed. It isn't worth as much as the normal categories so be sure to put your best work in the proper sections.

When done, export your submission as a PDF (File>Download>PDF Document), with the file name being your last name and first/preferred name, AdvReview, and the year you're submitting, separated with underscores (ex. Smith_John_AdvReview_2021).

Upload the PDF to the Advancement Review Submissions Form. Upload any video files included in your Advancement Review to this form.

The review is to help make sure everyone is hitting the expected quality standard for the major, making sure our classes are delivering what we want them to deliver, and to see where your strengths are for the Senior Portfolio courses.

Appendix D Advancement Review Rubric

Digital Painting and Rendering	**Little to None**	**Basic**	**Average**	**Good**	**Excellent**
Ability to simulate 3D forms in 2D space					
Ability to render lighting and shadow forms that look believable and legible					
Lighting and Composition					
Ability to control values through composition					
Ability to control use of color and color selection					
Ability to provide storytelling elements through visual cues in the composition					
Observational and Life Drawing					
Ability to work from visual observation when drawing from life					
Ability to represent the legibility of original observed object					
Ability to simulate forms, surface materials, textures and proportions of objects through observational study					
1-, 2- and 3-Point Perspective					
Understanding of 1-point perspective					
Understanding of 2-point perspective					

Understanding of 3-point perspective					
Conceptual Ideation					
Ability to execute conceptual ideas through critical thinking and problem-solving skills					
Ability to research and explore visual ideas through various ideation passes					
Ability to show legibility, functionality and application of concepts from an extensively researched visual library					
3D Prop Models – Final Renders					
Ability to show understanding of utilizing 3D forms to create 3D props and assets					
Ability to create high quality textures for 3D models					
Ability to display work cleanly that showcases models in an attractive way.					
3D Prop Models – Geometry & UV Layout					
Ability to represent understanding of topology and polyflow through clean cohesive geometry					
Ability to work from and stick to a Polly budget without exceeding it					
Ability to unwrap and pack UVs in a clean cohesive layout					

Ability to understand proper texture resolution that makes sense for the size/functionality of 3D model					
Ability to utilize all available UV space possible for maximum amount of texture detail					
3D Prop Models – Texture Maps					
Ability to create various different types of texture maps					
Ability to create high quality textures for 3D models					
3D Environments – Final Renders					
Ability to show understanding of 3D forms at an environmental scale in a visually appealing composition					
Ability to simulate believable lighting information that works throughout the environment's composition					
Ability to use visual storytelling elements throughout the environment as well as through lighting and composition					
Ability to display work cleanly that showcases environment in an attractive way					

3D Environment – Prop Kit & Modular Pieces					
Ability to understand principles of modular modelling techniques for 3D environments					
Ability to utilize modular modeling techniques to create modular geometry					
Ability to implement props from a prop kit specific to the environment					
3D Environment – Trip Sheet & Texture Maps					
Ability to understand and execute the use of trim sheets for modular environments					
Ability to create their own trim sheets					
Ability to use a texture resolution specific to each trim that makes sense for the size/functionality of their use in the environment					
Ability to utilize all available UV space possible for maximum amount of texture detail					
Ability to create various types of texture maps					
Ability to create high quality textures for 3D environments					
Storyboard Layout					
Ability to execute visual storytelling techniques through storyboarding					

Ability to utilize engaging cameral positioning and techniques that make boards visually engaging					
Ability to cohesively frame boards to create successful and interesting compositions					
Ability to display and execute a strong visual narrative					
Visual Storytelling					
Ability to execute visual storytelling techniques through drawing/illustration					
Ability to utilize lighting and color that makes the composition engaging and meaningful					
Ability to cohesively frame illustrations with impactful compositions to create visual storytelling cues					
Ability to display and execute strong visual narratives through a single illustration					
Team Project – Work, Contribution & Team Duties					
Ability to work collaboratively in a team-oriented environment					
Ability to contribute work off substance and merit to a team project					
Work accordingly to pipelines, deadlines, and execute tasks according to					

their duties and responsibilities designated to them by their team					

Appendix E IRB Approval

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

May 3, 2022

Nicole Lesher
Nathan Street

Re: IRB Exemption - IRB-FY21-22-753 The Relationship Between Game Art Students' Achievement and Their Perceived Quality of Assessment

Dear Nicole Lesher, Nathan Street,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d):

Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Please note that this exemption only applies to your current research application, and any

modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,
G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

Appendix F College Approval

January 31, 2022

Hélène Garrison PhD
Chief Operating Officer
Laguna College of Art and Design
2222 Laguna Canyon Road
Laguna Beach, CA 92651

Dear Nicole,

After careful review of your research proposal entitled: The Relationship Between Game Art Students' Achievement and Their Perceived Quality of Assessment. I have decided to grant you permission to access our students and invite them to participate in your study and to receive and utilize advancement review scores from the Game Art department for your research study.

Check the following boxes, as applicable:

☒ I will provide our appropriate Game Art student list to Nicole Lesher, and Nicole may use the list to contact our members to invite them to participate in her research study.

☒ I grant permission for Nicole Lesher to contact appropriate Game Art students to invite them to participate in her research study.

☒ The requested advancement review scores WILL BE STRIPPED of all identifying information before it is provided to the researcher.

☒ I am requesting a copy of the results upon study completion and/or publication.

Sincerely,

Dr. Hélène Garrison
Chief Operating Officer
Laguna College of Art and Design

Appendix G Participant Solicitation Email

Dear Students,

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a Doctor of Philosophy in Higher Education Administration degree. The purpose of my research is to evaluate the potential for students' perceptions of advancement review portfolio assessment practices in the Game Art program to influence their achievement of learning outcomes as determined by their Advancement Review scores. I am writing to invite eligible participants to join my study.

Participants must be students enrolled in the game art program who have already participated or are scheduled to participate in their **advancement portfolio review during the spring 2021, fall 2021, and spring 2022 semesters.** Students who have earned between 28-97 out of a possible total 122 credits are eligible for portfolio review. Participants, if willing, will be asked to complete an online survey. It should take approximately seven minutes to complete the survey. Participation will be completely anonymous, and no personal, identifying information will be collected.

You will be receiving an email this week from Survey Monkey. To participate, please complete the consent form embedded in the survey and then follow the instructions for completing the survey.

Participants who complete the entire survey will receive a $20 Starbucks electronic gift card.

Sincerely,

Nicole Lesher
Provost
(949) 376-6000 ex. 274

Appendix H Informed Consent Form

Consent

Title of the Project: The Relationship Between Game Art Students' Achievement and Their Perceived Quality of Assessment
Principal Investigator: Nicole Lesher, Provost Laguna College of Art and Design (LCAD)

Invitation to be Part of a Research Study

You are invited to participate in a research study. To participate, you must be enrolled in the LCAD Game Art program and have already participated in or are scheduled to participate in the advancement portfolio review during the spring 2021, fall 2021, and spring 2022 semesters. Students who have earned between 28-97 out of a possible total 122 credits are eligible for portfolio review. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research.

What is the study about and why is it being done?

The purpose of this study is to evaluate the potential for students' perceptions of advance review portfolio assessment practices in the Game Art program to influence their achievement of learning outcomes as determined by their Advancement Review scores.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following things:

1. Complete a 39-question multiple choice survey. The survey is estimated to take seven minutes to complete.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

Benefits to society include a contribution to Game Art curriculum and an understanding of Game Art students' perspectives about assessment practices.

What risks might you experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records.

- Participant responses will be anonymous. Participant responses will be kept confidential through the use of codes.
- Data will be stored on a password-locked computer and may be used in future presentations. After three years, all electronic records will be deleted.

How will you be compensated for being part of the study?

Participants will receive a $20 Starbucks gift card for participating in this study. Email addresses will be requested for compensation purposes; however, they will be pulled and separated from your responses to maintain your anonymity.

Does the researcher have any conflicts of interest?

The researcher serves as the Provost at Laguna College of Art and Design. To limit potential or perceived conflicts the college Registrar will ensure that all data is stripped of identifiers before the researcher receives it. This disclosure is made so that you can decide if this relationship will affect your willingness to participate in this study. No action will be taken against an individual based on his or her decision to participate or not participate in this study.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University or Laguna College of Art and Design. If you decide to participate, you are free to not answer any question or withdraw at any time prior to submitting the survey without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Nicole Lesher. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her. You may also contact the researcher's faculty sponsor.

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

Before agreeing to be part of the research, please be sure that you understand what the study is about. You can print a copy of this document for your records. If you have any questions about the study later, you can contact the researcher using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

_____
Printed Subject Name

_____
Signature & Date

Appendix I Survey Instructions

Dear Participant,

Thank you for agreeing to participate in this study, please complete the survey included in this email by May 30, 2022. Please focus your responses on your portfolio review assessment experience.

Click the done button when you have answered all the questions.

Participants who complete the entire survey will receive a $20 Starbucks electronic gift card.

Sincerely,

Nicole Lesher
Provost
(949) 376-6000 ex. 274

Appendix J Reminder Emails

Hi everyone,
I need your help! I need a total of 66 completed surveys so I can finish my research on the advancement review process. Otherwise, my data will be limited. Responses are totally anonymous. Please take a few minutes to complete this survey and Starbucks will be on me! Everyone who completes it gets a $20 card! You must answer all the questions to receive the gift card.
Thank you so much,

Hi Game Art Students,
I'm so close to getting the required survey responses and need your help. Please take just 5 minutes to complete this survey and I will send you a $20 Starbucks card today. Please help me out!
Nicole Lesher