Quality Approaches in Education

Working together to create life-long learning and individual and organizational success

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Quality Approaches in Education

Note From the Editor

Elizabeth A. Cudney

It has been a privilege serving the ASQ Education Division as the editor of *Quality Approaches in Education (QAE)* for the past five years. I have been honored to work with passionate and dedicated associate editors and authors in disseminating educational research. Starting in January, I will take on a new role within the ASQ Education Division as chair. It is my pleasure to introduce Dr. Marianne Di Pierro as the new editor of *QAE*. Di Pierro brings a wealth of educational background that will continue to grow this area of research.

This issue consists of three articles that discuss learning styles, student perseverance, and institutionalizing quality assurance in education. The first article, by Kevin Jones and Mesut Akdere, addresses learning styles and their implications for training and development. Appropriate training and educational programs can be developed by understanding not only the needs of the organization, but also those of the students or trainees. The next article, by Susan Murray, Stephanie Dukes, and Nathan Weidner, investigates the performance and retention of first-year students. In particular, it addresses the concept of grit, which is a measure of perseverance of effort and consistency of interest. The third article, by Raphael Muzondiwa Jingura and Reckson Kamusoko, explores institutionalizing quality assurance in higher education through internal structures and systems. The study identifies four phases to institutionalize quality assurance, which include awareness, experiential, expansion, and consolidation. These articles demonstrate the breadth of quality improvement in all facets of education, including learning, student motivation, and institutional practices.

Finally, I would like to take this opportunity to thank those instrumental in producing *QAE*. First, it has been a pleasure to work with Janet Jacobsen, who is the backbone of the journal as the copy editor. Her attention to detail and knowledge have taught me so much. I also would like to thank the associate editors for their continued dedication to the journal. Throughout the past five years, this role has also enabled me to work with outstanding researchers, who continue to bring new and refreshing ideas to the field of quality and education. I look forward to my new role as chair of the ASQ Education Division. Please join me in welcoming Dr. Di Pierro as editor of *QAE*.

Elizabeth A. Cudney, Ph.D. *is an associate professor in the Engineering Management and Systems Engineering Department at Missouri University of Science and Technology. In 2018, Cudney was elected an IISE Fellow. In 2018, Cudney received the ASQ Crosby Medal. In 2014, Cudney was elected an ASEM Fellow. In 2013, Cudney was elected as an ASQ Fellow. She was inducted into the ASQ International Academy for Quality in 2010. She received the 2008 ASQ A.V. Feigenbaum Medal and the 2006 SME Outstanding Young Manufacturing Engineering Award. Cudney has published six books and more than 65 journal papers. She holds eight ASQ certifications, which include ASQ Certified Quality Engineer, Manager of Quality/Operational Excellence, and Certified Six Sigma Black Belt, amongst others. Contact her at cudney@mst.edu.*

Elizabeth A. Cudney

Education Division's *Advancing the STEM Agenda* Book

A collection of conference papers from the 2011 Advancing the STEM Agenda Conference. Available through ASQ Quality Press.
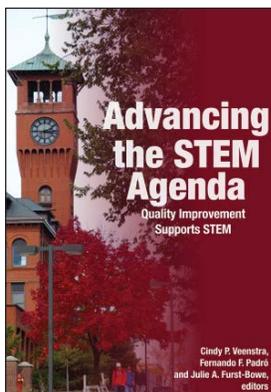
This publication is full of collaborative models, best practices, and advice for teachers, higher education faculty, and human resources personnel on improving the student retention (and thereby increasing the supply of STEM workers). Ideas that will work for both STEM and non-STEM fields are presented. The introduction maps out the current landscape of STEM education and compares the United States to other countries. The last chapter is the conference chairs' summary of what was learned from the conference and working with 36 authors to develop this book. This effort is part of a grassroots effort among educators to help more students be successful in STEM majors and careers.

"Veenstra, Padró, and Furst-Bowe provide a huge contribution to the field of STEM education. We all know the statistics and of the huge need in the area of STEM students and education, but what has been missing are application and success stories backed by research and modeling. The editors have successfully contributed to our need by focusing on collaborative models, building the K-12 pipeline, showing what works at the collegiate level, connecting across gender issues, and illustrating workforce and innovative ideas."

John J. Jasinski, Ph.D.
President, Northwest Missouri State University

"*Advancing the STEM Agenda* provides a broad set of current perspectives that will contribute in many ways to advancing the understanding and enhancement of education in science, education, and engineering. This work is packed with insights from experienced educators from K-12, regional, and research university perspectives and bridges the transition from education to workplace."

John Dew, Ed.D.
Senior Vice Chancellor, Troy University

Identifying learning styles to improve instruction and meet students' instructional needs

A Conceptual Comparative Analysis of Learning Styles: Implications for Training and Development

Kevin B. Jones and Mesut Akdere

Abstract

The purpose of this article is to identify implications of learning styles for the fields of education and training and development. A review of three well-known learning styles: Kolb's Learning Styles and Experiential Learning Cycle (1976), Felder-Silverman Learning Style Model (1998), and Honey and Mumford's Learning Styles Questionnaire (1992) are presented, including a description of each learning style instrument, the basic framework of the model, and the associated strengths and application challenges of each style. All three models have been empirically proven effective at informing students and instructors of student learning preferences. The Kolb model is the shortest and simplest instrument to implement but suffers from reliability concerns on test/retest, even over short periods of time. Conversely, the Felder-Silverman and Honey and Mumford models present longer and more extensive instruments but have higher reliability in test/retest examinations. While there is some debate in the literature concerning the benefits and utility of these instruments, all three aim to help and enhance the learning environment by providing insights to students and instructors alike. Trainers should consider convenience versus consistency when determining which model best meets their instructional needs. Implications for management training and education are also discussed.

Introduction

Learning styles have become an emerging concept related to learning in general. They help to identify how individuals best learn as well as the environments that are conducive to those learning preferences. Although they are not based on a centralized learning styles theory, they continue to be developed and expanded. "Learning style is the composite of characteristic cognitive, affect, and psychological factors that serves as an indicator of how an individual interacts with and responds to the learning environment" (Duff & Duffy, 2002, p. 148). The purpose of this article is threefold: understand how instructors and trainers involved with learning and development typically identify learning styles, recognize the most common instructional methods used that integrate learning styles, and explore the implications for training and development.

To first understand how learning styles relate to the field of training and development, three models are reviewed: Felder-Silverman, Kolb, and Honey and Mumford. For each model, a brief review is provided along with how the model identifies learners, what instruments are used, and the model's advantages and disadvantages. A framework is created to compare and contrast different learning theories as well as make connections to practical applications. Although information and research exist primarily in the field of education, there are many parallels related to learning styles in other disciplines.

Learning Styles

Everyone learns differently, and an instructional method that effectively helps one learn may not necessarily prove to be equally effective with another learner. "The study of learning styles involves the investigation of individual differences: people perceive and gain knowledge differently, they form ideas and think differently, and they act and respond to knowledge differently" (Duff & Duffy, 2002, p. 148). The concept of learning styles has been an important topic in many areas, especially in the field of training (Raelin & Coghlan, 2006; Backhaus & Liff, 2007). For example, research and development of adaptive systems is driven by learning style models that state individuals have different ways they prefer to learn (Graf, Viola, Leo & Kinshuk, 2007). Incorporating those preferences into teaching plans may help students or trainees achieve learning goals. The objective of learning styles is to help individuals in learning, which comes in various forms: learning new or difficult information and attaining or maintaining certain skills or behaviors, amongst others. Different learning styles have become widely adopted in various industries. Kolb's Learning Styles and Experiential Learning Cycle (KLSELC) (1976), Felder-Silverman Learning Style Model (FSLSM) (1998), and Honey and Mumford's Learning Styles Questionnaire (HMLQ) (1992) are among the most commonly used.

Kolb's Learning Styles and Experiential Learning Cycle (KLSELC)

A simple definition of experiential learning is learning through experience or learning by doing. The theory is called experiential learning for two reasons: it combines theory from the social psychology of Kurt Lewin from the 1940s with sensitivity training from the 1950s and 1960s, and it emphasizes the importance of personal experience in the learning process (Kolb, 1981). This can be most easily demonstrated by infants, who cry when they need food or a new diaper. Very early on infants learn that if they need anything, they need only to yell and/or cry to have their needs met. The KLSELC describes the same—people learn by what is happening around them.

KLSELC defines learning as, "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 3). Kolb's model is based on six propositions: learning is conceived as a process, learning is continuous through experience, learning requires the resolution of conflicts between conflicting ideas, learning is a process of adaptation, learning results from interactions between the person and environment, and learning is the process of creating knowledge (Manolis, Burns, Assudani, & Chinta, 2013). These propositions give way to four learning modes, which are based on two continuums:

processing (how people approach a task) and perceiving (a person's emotional response to a task) (Hawk & Shah, 2007). Kolb describes experiential learning as a four-stage cycle encompassing a concrete experience (doing or having an experience), reflective observation (reviewing/reflecting on the experience), abstract conceptualization (concluding/learning from the experience), and active experimentation (planning/trying out what you have learned) (Hawk & Shah, 2007; Kolb, 1981).

Figure 1 shows two relationships. The first is the relationship among the four learning modes and the two continuums: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). The second is the relationship of the four learning styles that are a combination of two learning modes: accommodator (CE & AE), diverger (CE & RO), assimilator (AC & RO), and converger (AC & AE).
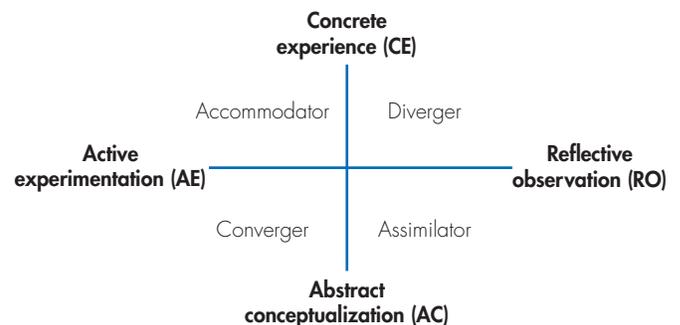
Figure 1: Kolb's Experiential Learning Model
(Manolis, Burns, Assudani, & Chinta, 2013, p. 46)

Kolb's Learning Style Inventory (LSI) was originally a nine-item questionnaire that asked respondents to rank four words in a way that best describes their learning style (Kolb, 1976). It was modified by Kolb (1984) to be a 12-item questionnaire. Each of the four words for every question was related to one of the learning modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Depending on the rank of the words for each question, the respondents would then be able to identify their preferred learning style. Each of the four learning styles are a combination of a two learning dimension: accommodator (CE/AE), diverger (CE/RO), converger (AC/AE), and assimilator (AC/RO). Table 1 details each style's preferences.

Kolb's initial LSI has been widely studied since its creation, and there has been a normative version of the original LSI that used ratings instead of rankings. Merritt and Marshall (1984) found both the original and the normative LSI to be valid and reliable. Manolis et al. (2013) stated, "This was an important

Table 1: Descriptions of Kolb's Four Learning Styles

	Active experimentation (AE)	Reflective observation (RO)
Concrete experience (CE)	**Accommodating (CE/AE)** • Experience through carrying out plans that involve new challenges, tend to be risk takers, and often seen as impatient. • Strengths: implementing plans and tasks and getting involved in new activities. • Prefer setting goals, working in teams to complete tasks, and action-oriented jobs.	**Diverging (CE/RO)** • Experience a situation and then later reflect through many different perspectives. • Strengths: use imaginative and creative ability to relate to others, communication skills, open to feedback from others, and brainstorming. • Prefer working in groups and tend to specialize in humanities and liberal arts areas.
Abstract conceptualization (AC)	**Converging (AC/AE)** • Find practical uses for ideas and theories learned and have narrowed interests. • Strengths: problem solving, setting goals, and decisiveness. • Prefer experimenting, simulating, and using practical applications for their knowledge, and things rather than people.	**Assimilating (AC/RO)** • Take in lots of information and logically arrange it and more concerned with abstract problems. • Strengths: organized, plan, and engage in inductive reasoning and creating theoretical models. • Prefer logical and thought-out information, reading, lectures, and time to analyze information.

Sugarman, 1985; DiMuro & Terry 2007; Turesky & Gallagher, 2011; Manolis, Burns, Assundani & Chita, 2013; Kolb, 1981.

study because it not only suggests that Kolb's early work and theories about experience and learning styles appear to be valid and reliable, but it also encouraged others to build upon and improve Kolb's work" (p. 46). Manolis et al. (2013) conducted a study to transform "the LSI from a type (categorical measure) to a degree (continuous measure) style of learning style measure that is not only more parsimonious but is also easier to use than the existing LSI" (p. 44). Using Kolb's model to design hands-on activities in a virtual computer lab, Konak, Clark, and Nasereddin (2014) argue that such activities designed based on Kolb's model enhance student learning outcomes. Although there was some support for Kolb's work, not all who researched this model agreed with the original findings that his work was valid and reliable (e.g., Fox, 1985; Freedman & Stumpf, 1978; Geller, 1979; Lamb & Certo, 1978; West, 1982). The scale proved to be very unreliable in test-retest measurements, meaning a person could take the assessment twice and not receive the same or even similar results from the first to second assessment.

What seems to be advantageous about Kolb's LSI is that it is short, easy to administer, and provides apt descriptions of the environments in which individuals best learn and their preferences in learning. The length of this 12-item questionnaire also makes it easy to self-administer and self-score in a variety of settings where it would be difficult to implement longer inventories (Kolb, 1999, 2000). The main disadvantage of the LSI is that research has shown that it has a weak test-retest ability. Test-retest ability is an important factor when it comes to assessing learning styles because individuals should be able to take the test multiple times and obtain the same results. That does not mean that test-retest ability over long periods of time still has to be reliable. Results become questionable, however, when multiple tests over a short period have different outcomes.

Felder-Silverman Learning Style Model (FSLSM)

According to Carver, Howard, and Lane (1999), "the Felder Model is most appropriate for hypermedia courseware" (p. 81). Many fields use the FSLSM (shown in Figure 2), but it is often found in research related to learning styles in technology-enhanced learning (e-learning) as well as education in general. The popularity of e-learning in training programs has started to grow because it offers a cadre of conveniences to the learner from flexible time management to cost and affordability. Research and company experience have also indicated that e-learning is effective in learning a variety of outcomes (Noe, 2016).
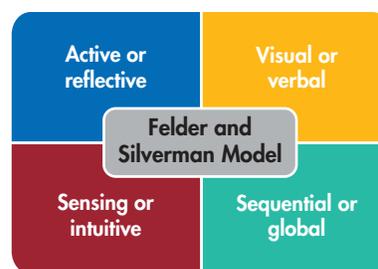
Figure 2: Felder-Silverman Learning Style Mode

The FSLSM also addresses the various teaching methods that learners may encounter: lectures, discussion, application of principles, memorization, and understanding (Felder & Silverman, 1988). Because there are many ways to present material, instructors should be able to vary instruction to help students and trainees learn. Unfortunately, sometimes that does not happen. Hawk and Shah (2007) believe that most higher-education faculty members model their styles of instruction, at least initially, from their preferred styles of learning as well as the methods that they found to be

effective in their own higher-education program. The combination of preferred learning styles and familiarity with styles utilized in other higher-education programs could prevent faculty from seeing other learning/instruction styles or from adopting other styles. The FSLSM highlights the importance of instructor and trainer awareness around how students or trainees learn as well as the need for intentional plans and methods of teaching to improve the learning process. Felder and Silverman (1988) said, "Student[s] learn in many ways—by seeing and hearing; reflecting and acting; reasoning logically and intuitively; memorizing and visualizing and drawing analogies and building mathematical models; steadily and in fits and starts" (p. 674).

To find individuals' preferred learning styles, the Felder-Silverman model uses the Index of Learning Styles (ILS), which was developed by Solomon and Felder (2005). The ILS instrument is a 44-item questionnaire that can be administered and scored or self-administered and self-scored to identify the individual's learning style. Most other learning styles classify learners into a few groups, whereas FSLSM describes the learning style in more detail, distinguishing between preferences on four dimensions: experiencing (concrete experience), thinking (abstract conceptualization), reflecting (reflective observation), and doing (active experimentation) (Graf et al., 2007).

The four dimensions make up the eight potential learning styles that individuals could prefer: sensing, intuitive, visual, auditory, active, reflective, sequential, and global. Each of these types of learners have different strengths and prefer a specific type of instruction style and learning environment as illustrated in Table 2.

Felder-Silverman's ILS is beneficial because it is an in-depth questionnaire, provides a detailed model, and can be self-administered and scored. The research by Felder and Spurlin (2005) as well as Graf, Viola, Leo, and Kinshuk (2007) both support the idea that the ILS is a reliable assessment tool for identifying learning styles. It is helpful that the ILS can be self-administered and self-scored because that allows anyone to take the questionnaire easily at any time (Van Zwanenberg, Wilkinson, & Anderson, 2000). The model also provides detailed descriptions of all eight learning styles so that learners and instructors can better understand how people with each style learn best. One disadvantage of the ILS is the length of time that it takes to complete the 44-item questionnaire. As the FSLSM is often used in educational settings, this can be an issue because considerable class time is required to administer the questionnaire.

Honey and Mumford's Learning Styles Questionnaire (HMLQ)

Honey and Mumford (1992) described a learning style as, "a description of the attitudes and behavior which determine an individual's preferred way of learning" (p. 147). Similar to the KLSELC, Honey and Mumford agree that individuals learn best from their experiences but contend that experiences alone do not guarantee effective learning (Caple & Martin, 1994). The HMLQ was derived from the KLSELC and attempts to address its reliability and test-retest shortcomings. Honey and

Table 2: Preferred Instructional Methods for Felder-Silverman's Eight Individual Learning Styles

Sensing learners	• Like facts, data, experimentation, working with detail, real-world connections, and standard methods. • Good at solving problems and memorization. • Work slowly, but are careful.
Intuitive learners	• Like ideas, principles, theories, innovation, and discovering new possibilities. • Good at grasping new concepts and working in abstractions. • Work quickly, but can be careless since they dislike detail.
Visual learners	• Like pictures, diagrams, flow charts, time lines, films, and demonstrations. • Good at learning by watching others.
Verbal learners	• Like discussion, verbal explanations, explaining ideas to others in their own words, and taping lectures. • Good at remembering much of what they hear and explaining themselves.
Active learners	• Like discussing or explaining experimentation involving the external world, actively being involved in learning, and testing to see if things work. • Prefer working in groups and being an experimentalist.
Reflective learners	• Like opportunity to think about information being presented and think through tasks before doing them. • Prefer to work independently.
Sequential learners	• Prefer to follow linear reasoning processes for problem solving, step-by-step procedures, and learning in a steady progression of complexity. • Good at mastering material as it is presented, working with partially or superficially understood material, and analysis.
Global learners	• Like to make intuitive leaps that yet might not be able to explain how they got their solution, jump directly into more difficult material, and see the big picture. • Good at pushing through confusing material until they "get it," synthesizing and integrating, and working intuitively.

Felder & Silverman, 1988; Hawk & Shah, 2007

Mumford formulated a new assessment tool, the Learning Styles Questionnaire (LSQ), which has been applied primarily to the field of training and development (Duff & Duffy, 2002).

Honey and Mumford (1992) believed that single-word descriptors were insufficient for learning style classifications. They further developed Kolb's four-stage process and changed terminology as shown in Figure 3. Instead of using processing and perceiving, they use prehension (grasping information from experience) and transformation (processing of information grasped) (Duff & Duffy, 2002). The LSQ was created as a self-administered, 80-item questionnaire consisting of 80 statements that correlate to one of the four learning styles: activist (someone who is better equipped to learn from experience), reflector (someone who is better equipped for reflective experience), theorist (someone who learns best from exploring associations and interrelationships between ideas), or pragmatist (someone who prefers activities based on doing or trying things that yield practical benefits) (De Vita, 2001). For each question, individuals indicate whether the statement applies to them or that it does not. Once complete, a grid sheet is used to score the questions associated with each learning style with the totals then identifying the individual's preferred learning style. The LSQ is considered by some to be a greater method of evaluating learning preferences because of its reliability, theory, and face validity (Swailes & Senior, 1999; Cockerton, Naz, & Sheppard, 2002; Penger & Tekavcic, 2009). Conversely, further investigation concluded no evidence of construct validity and reliability and that the LSQ inadequately assessed learning styles (Duff, 2001; Duff & Duffy, 2002).

The most significant advantage of the LSQ is that it adds depth to its counterpart, Kolb's LSI, and it may be a better assessment for identifying learning styles. There is evidence suggesting

the LSQ is a more reliable assessment than Kolb's LSI (De Ciantis & Kirton, 1996). Using Honey and Mumford's (1986) Learning Styles Questionnaire, Jepsen, Varhegyi, and Teo (2015) report that "learners with dominant reflector or activist styles are influenced in their perceptions of teaching quality of their teacher or lecturer" (p. 575).

Learning Styles in Higher Education

Available research on the application of learning styles is contradictory. There are no clear methods of measuring success in implementing knowledge of learning styles to a situation. After examining three different applications of learning styles within a university in nursing education and in e-learning, results from learning style studies in training and development show significant variation.

In a quasi-experimental study, Azevedo and Akdere (2010a) examined whether having awareness of one's learning style would enhance and improve learning and transfer of training. Their findings indicate that students' awareness of learning styles did not help their academic performance but, rather, hindered it. Shinnick and Woo (2015) were intrigued by the potential correlation between the impact of learning style on nursing students' knowledge gains after a heart failure (HF) human patient simulation (HPS) experience in pre-licensure nursing students. They used a sample from four different cohorts of nursing students at the same point in their pre-licensure program to see if learning styles impacted an increase in student knowledge of HF. Huang, Lin, and Huang (2012) tested a model that examines the mediating process between one's learning style and e-learning performance as well as the potential effects of prior subject knowledge. The conclusions from Shinnick and Woo (2015) imply that HPS has a greater effect with certain learning styles (specifically diverging and assimilating styles).

Finally, Huang et al. (2012) conducted a study on learning styles in an e-learning environment and reported a significant relationship between the sensory and intuitive dimension of learning styles and individual learning performance. Although previous studies examined learning styles in various modes in higher education, further research is needed to explore the developmental aspect of the individual learner to discover new theoretical underpinnings of learning styles within the training and development context. Specifically, we still do not know how fluid we are in our preferred learning styles. Do we change our preferred style in time? Or, do we adopt to a new style when facing a different learning environment or motivation to learn? How should we study learning styles in a new learning environment such as augmented reality or virtual reality as related to training and development? Do these immersive technologies demand a completely new approach for
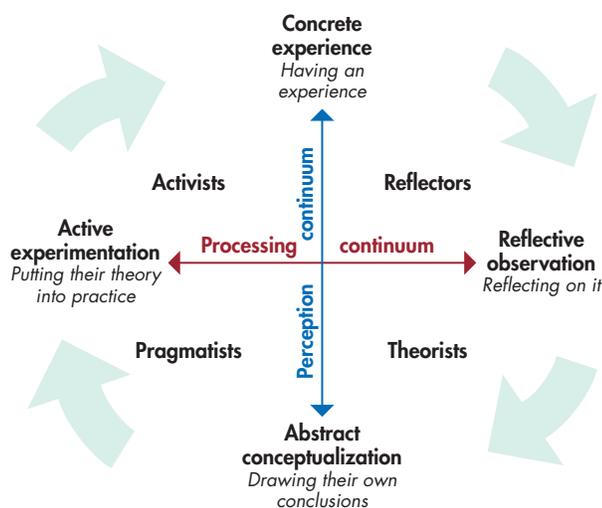

Figure 3: Honey and Mumford's Learning Styles Model

studying learning styles for the purposes of training and development? As apparent from these questions, we are just scratching the surface with respect to understanding the implications of learning styles in training and development.

Implications for Training and Development

The idea of learning styles is important for fields such as education but it also relates to training and development. To implement training programs successfully, trainers need to understand how their audience best learns. Then instructors and trainers can understand how to best diversify their methods of instruction to accommodate as many learning preferences as possible. "By making learners aware of learning styles, trainers may encourage them to realize the importance of appropriate learning styles for different disciplines or subjects, and that such styles may, hopefully, be changed to suit changing learning situations" (Fatt, 1993, p. 19). In a study related to nursing training, Rassool and Rawaf (2007) found that "A mismatch between teaching style and the learning styles of students has been found to have serious consequences" (p. 35). Similarly, Poore, Cullen, and Schaar (2014) also highlight the role of learning styles both as a foundation and a process for learning based on the needs of each individual learner. The main idea lies in the notion of helping trainers be knowledgeable about individual learning preferences and utilize various approaches to effectively deliver training programs.

Learning styles are considered a potential element in designing training programs. As individuals inherently learn differently, such distinctions may be critical in the successful execution of learning in general and development of training programs in particular. Azevedo and Akdere (2009, 2010b) argue for diversifying methods of instruction within a training program, similar to the applications discussed earlier in academic settings. Accommodating each person's preferred learning style is not realistic nor practical. However, trying to engage as many learners as possible through varied instruction is feasible.

The development of a training program should reflect the needs of the organization as well as its trainees. The outcomes of the training program (e.g., learn new knowledge and change behaviors) serve as a continual guide for trainers to ensure that it revolves around the outcome. Preferred learning style, environment, type of instruction, and activities used in a training program need to be considered in the development process. Although the research findings differ, varying the type of instruction and activities will help reach and accommodate as many trainee managers as possible.

Conclusions and Future Research

Learning styles help identify and define how people learn and the environments in which they prefer to learn. Felder-Silverman,

Kolb, and Honey and Mumford's methods use separate avenues to identify types of learners and how they function in various environments. Each method has strengths and shortcomings, but the concept of learning styles is important and relevant to a global world of business. When trainers understand how trainees best learn and develop essential skills, competencies, and attitudes, they may be able to design effective training programs that address many complexities of the workplace successfully.

"Learning styles have been recognized as being an important factor for better understanding the model of learning and the learning dispositions/preferences of students" (Filippidis & Tsoukalas, 2009, p. 186). Although there is contradicting research regarding the successful implementation of learning style theories, it is evident that people learn and process information in different ways. Some are internal processors, whereas some prefer collaborative learning. One of the most significant factors in helping trainees achieve success are trainers who are willing to meet their trainees where they are. The same can be said for those developing employee training programs and helping to fill their employees' needs, meeting staff members at their knowledge level, and working to help them become successful managers.

Potential areas for future research include investigating if learning styles change through time, whether people can perform well when adapting to other learning styles, how the effectiveness of the training program is measured, if learning style changes occur between generations, and why there is not a centralized learning style theory. People grow, evolve, and adapt in time to their surroundings. Although the average age of college students is 18-21, students' brains are not fully developed until well into their 20s (Dosenbach et. al, 2010). Students are challenged to reflect and think critically, work collaboratively, and adapt to their environment. Could individuals' learning styles also change over time? Not that everyone would have the same or similar learning styles, but to discover if learning styles do change is important for understanding how people adapt to different learning environments.

Learning style inventories are useful for identifying how individuals prefer to learn, what activities can help them learn, and what environments best suit those individuals. Although it's beneficial to know learning styles and ideally preferable to use them, they are not always utilized in education. Professors will use teaching methods with which they are most comfortable and familiar, but these are not always consistent with the preferred learning styles of students. Could individuals work to adapt to an instruction? That ability would be an important piece of knowledge for learning styles.

Different generations are raised in distinct environments. For example, today's millennials grew up in a technology-driven

environment, which constantly advanced and accelerated the pace of life. Compare that with baby boomers, who came of age without personal computers, cellphones, and the need to be connected 24/7. With such drastic changes in today's society, it begs the question of how these variations would affect an individual's preferred learning style. Finally, there is not a centralized theory of learning styles. At the core of learning styles, specific theories are not mentioned or referenced. Further, empirical exploration of theories associated with learning styles is necessary to advance the field.

Acknowledgement

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Identifying predictors for academic retention and success

Improving First-Year STEM Students' Performance and Retention: Is Grit the Answer?

Susan L. Murray, Stephanie Dukes, and Nathan Weidner

Abstract

Researchers throughout academia continue to search for non-cognitive predictors that may better enable forecasting academic retention and success. One such construct that has emerged as a viable candidate to improve this prediction is grit (Duckworth, 2016). This article provides an introduction and overview of the concept of grit for those not yet familiar with it. Additionally, the present study examined the degree to which grit could be improved through a targeted intervention for first-year college students enrolling in STEM majors. Findings suggested that grit may be somewhat improved through targeted interventions. Grit may, therefore, hold more promise for improving academic retention and achievement than other non-cognitive predictors such as conscientiousness, which is typically considered to be less malleable.

Keywords

Retention, Grit, Student Performance, Academic Retention

Introduction

There is great concern for the economic strength and global standing of America due to the lack of science, technology, engineering, and mathematics (STEM) graduates. While the data shows that the number of undergraduate students majoring and graduating in engineering has grown throughout the past 10 years (ASEE, 2016), many still have concerns. The National Academies of Sciences, Engineering, and Medicine (2016) reported that approximately half of the students entering college on the course of earning a bachelor's degree in a STEM field are not reaching that goal within four to six years. In addition to the issue of the time it is taking to obtain these degrees, students are leaving STEM fields altogether.

As the nation struggles to educate engineering students, an increasing emphasis is being placed on retaining students who have decided to major in STEM fields. The American Society for Engineering Education (ASEE) annually surveys more than 100 U.S. colleges and universities about educational trends in undergraduate engineering programs. From 2003 to 2014 the society has found an overall upward trend in students remaining in STEM fields after finishing their first year of college education. Caucasian students made up the largest portion of the students and showed the greatest increase in persistence from 78% to 82%. There was a smaller increase, from 84% to 87%, for Asian American students (ASEE, 2016). There was less than half a percent increase found in African-American and Latino/Hispanic students, who also were a much smaller portion of STEM students overall and have lower retention rates in general.

Literature Review

With an increased emphasis on improving retention of STEM students, the personality trait of grit could be an important part of the solution. Duckworth, Peterson, Matthews, and Kelly (2007) developed a statistically sound measure of grit. They and other researchers have not only shown grit can be reliably measured, but that this trait can also be helpful in predicting perseverance and success in numerous situations. Grit can be divided into two

main facets: perseverance of effort and consistency of interest (Duckworth Peterson, Matthews, & Kelly, 2007). Perseverance of effort is the ability to continue through and overcome difficulty or failure. This ultimately allows a person to excel in an area where others would have given up when facing obstacles. Consistency of interest is maintaining the same goals and interests through the course of months or years. This consistency can help an individual persevere through the many hours typically needed to become proficient in a task. Together these two sub-traits likely influence college students if they struggle and feel a strong desire to quit during their college education.

The perseverance of effort facet proves to be a better predictor of success in children while consistency of interest is the better predictor with adults (Duckworth et al., 2007). When adolescents were assessed, grit showed to be a predictor of GPA, involvement in extracurricular activities, and overall success in education. A study of Chicago Public Schools focused on high school graduation rates. Prior to the use of grit, schools were using demographics such as race and economic status; standardized test scores; overall school safety, and student support given by the school, family, and peers to predict if students would successfully graduate high school. Juniors from 98 Chicago schools were asked to take a large assessment, including four items from the short grit scale (GRIT-S) scale. One year later, 88% of the students in the survey had graduated (Eskeris-Winkler, Shulman, Beal, & Duckworth, 2014). Grit was strongly correlated with study habits and motivation but again provided the best overall predictor of graduation.

Grittier adult test subjects show a higher rate of completing an advanced education and a lower rate of job changes. A study on military members preparing for the Army Special Operations Forces (ARSOF) selection course showed more grit correlated with higher retention rates. The ARSOF is an elite program with demanding physical and mental entrance requirements, but the military continued to see an approximate 50% drop rate before the program was completed. Results show the soldiers who were at least one standard deviation higher in grit score were 32% less likely to withdraw from the program early (Eskeris-Winkler et al., 2014). Retention rates were also studied in a large company's sales representative staff. Previously, the best predictor of success in this field was the Big Five personality traits, which did not help provide insight on one's longevity on the job. Again, the results showed grittier sales representatives remained with the company six months longer.

Is Grit Conceptually Distinct?

Researchers have identified multiple constructs that are believed to conceptually overlap with grit. For example, grit has been found to have high overlap with variables such as self-control, cognitive self-regulation, and behavioral engagement (Muenks, Wigfield, Yang, & O'Neal, 2017). Perhaps grit shares the strongest relationship with conscientiousness (Abuhassàn & Bates, 2015). In particular, the perseverance of effort dimension of grit has been found meta-analytically to relate highly to conscientiousness (Credé, Tynan, & Harms, 2017). Some researchers have even gone so far as to argue the genetic drivers of both conscientiousness and grit's perseverance of effort are essentially the same (Rimfeld, Kovas, Dale, & Plomin, 2016).

While many researchers have suggested that grit may overlap heavily with conscientiousness, others have found evidence for conceptual distinction and even predictive differences. Muenks, Yang, and Wigfield (2018) found that grit was distinct from commonly measured constructs of future orientation including future-time perspective (Husman & Shell, 2008) and perceived instrumentality (Greene, Miller, Crowson, Duke, & Akey, 2004). As grit is conceptually focused on maintaining interest and effort toward long-term goals specifically (Duckworth & Gross, 2014), this may offer one area of conceptual distinction from other psychological constructs. Similarly, Meriac, Slifka, and LaBat (2015) demonstrated that although grit, conscientiousness, and work ethic were related constructs, they were able to contribute incremental prediction over one another toward various work-related outcomes. More specifically, while work ethic contributed more to the prediction of job satisfaction and turnover intentions, grit was able to contribute meaningful variance to the prediction of perceptions of stress. More importantly, some studies found that grit is capable of contributing incremental variance toward the prediction of academic outcomes beyond other commonly used measures. For example, in their original work, Duckworth et al. (2007) found that their measure of grit contributed incremental variance toward the prediction of educational attainment, retention, and GPA beyond measures of conscientiousness and IQ.

However, a more important question has yet to be answered: Is it possible to increase grit? If we can provide students with the means to increase grit and improve their ability to preserve, we could change higher education. Retention rates would improve. The return-on-investment for college education expenses would be greater. Individuals would have more opportunities as a result of succeeding in their education. Society would benefit from the increased level of education.

The hypothesis whether one can change the amount of grit they possess is still an active area of research. Some researchers suspect that children who have more of a growth mind-set may be able to become grittier. Psychological researchers have shown evidence of brain plasticity—that the human brain can change

with experience (Yeager & Dweck, 2012), which would support the notion that one's level of grit can also change.

In their essay, Fitzgerald and Laurian-Fitzgerald (2016) argue that schools should be concerned with non-cognitive skills such as grit. They challenge educators to learn about grit and growth mindset to prepare students to face real-world problems. They believe such a focus on grit would help students to be more likely to persevere. In a conversation in 2013, Duckworth, the renowned grit scholar, was asked whether we can encourage young people to develop grit or if it is something they are born with (Perkins-Gough, 2013). She stated her interest in exploring interventions for middle school students to enhance grit. In the same discussion, Duckworth provided some ideas for those wanting to help students grow their grit. She believes we should create interest in a topic, appreciation for practice, and a sense of purpose in students to enhance grit and student success (Perkins-Gough, 2013).

In her book *Getting Grit* (2017), Caroline Adams Miller suggests steps to cultivate one's level of grit. This includes determining what you are passionate about, setting goals, and self-regulation. She suggests exercises to cultivate perseverance including surrounding yourself with other gritty people working on similar pursuits, giving yourself incentives for achieving goals, surrounding yourself with positive stories of people overcoming hardship, and acting as if you are a gritty person with perseverance.

In a study of U.S. and Canadian college students, Hill, Burrow, and Bronk (2016) found evidence that having a purpose in life may encourage individuals to develop beneficial characteristics such as a gritty disposition. They speculate that purpose is a catalyst for developing grit rather than an outcome of personality development. In their 2017 meta-analysis on the grit literature, Credé, Tynan, and Harms, (2017) raised concern over the usefulness of grit as predictor of student performance and questioned the wisdom of interventions designed to increase grit.

Research Method

In an effort to determine if the level of grit in first-year college students can be increased using an academic intervention, an intensive summer education program, Hit the Ground Running (HGR), with the goal of improving student performance was studied. The level of grit among entering first-year students was measured at the start and completion of the program in 2018.

Participants

Incoming freshman college students (N = 76) enrolling in STEM majors at Missouri University of Science and Technology were recruited for the study. Approximately 81% of the participants were Caucasian, 8% were Asian/Pacific Islander, 4% were African American, 3% were Hispanic, and 4% were multiple races. In addition, nearly 78% of participants were male. More than 93% of participants selected engineering and/or science as their intended major of study (72% engineering, 17% science, and 4% dual major). Of the 96% of participants who reported age, all were between 17 and 19 years old. Self-reported rank was provided by 76% of participants, showing 30% of participants ranked in the top 10% while no participants ranked in the lower 50% of their high school class. Less than 20% of the participants reported as first-generation students. Students received participation points in the student-success portion of the HGR program, which went toward their overall grade for the three-credit-hour course earned at the end of the program.

Measure

The GRIT-S is an eight-item measure of grit, which has been found to be applicable to a variety of demographic groups ranging from adolescents to adults (Duckworth & Quinn, 2009; Duckworth et al. 2007). The GRIT-S has two subscales, which consist of four items measuring consistency of interest (Interest) (e.g. "I often set a goal but later choose to pursue a different one" reverse scored) and four items measuring perseverance of effort (Effort) (e.g. "I finish whatever I begin"). All items are rated on a scale with responses ranging from 1 (Not at all like me) to 5 (Very much like me).

In the present sample, the GRIT-S measure showed slightly low estimates of internal consistency reliability for the overall scale (α = .66) as well as for its two sub-scales, Interest (α = .60) and Effort (α = .66), when administered as a pre-test. The post-test, however, did show acceptable levels of reliability for both the full GRIT-S (α = .74) as well as both the Interest (α = .70) and Effort (α = .72) sub-scales. It should be noted that due to the two-factor structure of the data and the relatively small sample size, these estimates may not accurately reflect the true reliability of the measure (Yurdugül, 2008). Previous research has found the scale to be both a reliable and valid measure of grit (Duckworth & Quinn, 2009; Duckworth et al., 2007).

Procedure

A program was created at the university to help students increase their persistence rate within their chosen STEM field. The HGR program allows students to get acquainted with fellow classmates, become comfortable navigating the campus, and learn valuable tools to help them be successful in their college career. The HGR program is a three-week summer session during which students live in dorms and earn three credit hours. All students are required to take math, English, and student-success

classes. Chemistry classes are provided for students who scored high on a math-placement exam. Students who scored low on the math-placement exam are enrolled in an intensive algebra course and do not attend the chemistry class.

In addition to their daily classes, students participate in team-building and leadership activities. The students have interactions not only with faculty and staff members, but also with upper-classmen who serve as HGR mentors throughout the program. Students' self-reported grit was assessed on the second day of the program and again at the end of the three-week session.

Results

In order to test the hypothesis that this targeted HGR intervention could improve grit in college freshman STEM students, a paired sample t-test was calculated on their self-reported grit scores from before and after they completed the program. The one direction paired sample t-test, indicated a statistically significant ($t(75) = 1.91$, $p = 0.030$) increase in GRIT-S scores between pre (M = 3.20, SD = 0.55) and post (M = 3.28, SD = 0.58) HGR program completion. While the effect size was relatively small (Cohen's $d = 0.22$), it does indicate that participants, on average, showed a modest increase in their self-reported grit after completing the three-week HGR program.

Follow-up analyses of both sub-scales indicated that this effect was primarily driven by the persistence of effort dimension of grit. More specifically, there was no statistically significant difference ($t(75) = -1.45$, $p = 0.925$, Cohen's $d = -0.17$) between pre (M = 2.37, SD = 0.80) and post (M = 2.25, SD = 0.73) HGR program responses to the Consistency of Interest dimension of the GRIT-S. Contrary to the hypothesis, the mean differences actually reflect a non-significant decrease in the Consistency of Interest dimension of grit as a result of the HGR intervention. There was, however, a statistically significant increase ($t(75) = 2.81$, $p = 0.003$, Cohen's $d = 0.32$) from the pre (M = 3.32, SD = 0.72) to post (M = 3.51, SD = 0.79) HRG program scores on the perseverance effort dimension of the GRIT-S. This indicates that the increase in grit was driven by a small- to medium-effect-size increase in the perseverance of effort dimension of grit.

Discussion

The present results highlight the importance for further study of grit, in particular in the academic domain. The intervention for first-year college students was able to improve grit and, in particular, improve the persistence of effort dimension of grit. Individual differences such as conscientiousness and IQ, while traditional predictors of academic outcomes, are considered to be relatively stable characteristics. In light of the present findings, grit may present an individual difference that is more malleable

in nature. Given the established relationship between grit and various academic outcomes, enhancing grit in students may prove to be an effective method for improving student outcomes.

The sample size for this study was relatively small. Further, the demographics of students at Missouri University of Science and Technology, and therefore the participants in this study, are not representative of all races/ethnicities and genders. The HGR program is only open to new students and does not capture any student who has transferred from another school. As students are required to live in dorms, non-traditional students typically do not participate in HGR.

Future Directions

The intensive HGR program is offered over three weeks. While there was some change in the overall GRIT-S scores, a longer period of interventions may show more significant results. As a follow-on study, this cohort will be evaluated after their first year to see the relationship among their scores on the GRIT-S scale, GPA, and continuation in their major. In addition, research should be conducted to determine if there is a correlated increase in grit score when the interventions are spread throughout a semester or academic year to determine if they are still as effective.

After seeing a change in the persistence of effort facet, but not consistency of interest, further research is needed to determine if overall interest can be improved, or if the driving force changing the total GRIT-S score is solely due to an increase in effort. If interest cannot be increased, it will allow interventions to be more targeted to increasing one's effort. Additional research is needed to determine if similar results will be reflected with a more diversified group of students. This could also include additional studies of non-traditional students to determine if age is a factor in the amount of grit one has and their ability to increase it.

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Implementing quality assurance structures and systems to institutionalize quality in higher education

Institutionalization of Quality Assurance in Higher Education: Experience of a University

Raphael Muzondiwa Jingura and Reckson Kamusoko

Abstract

The objective of this article is to disseminate knowledge acquired from experiential learning and contribute to the enhancement of institutionalization of quality assurance in higher education. The information provided is based on the experience of Chinhoyi University of Technology. Institutionalization of quality assurance is the process of setting up internal quality assurance structures and systems. There are several essential elements that must be in place for successful institutionalization of quality assurance. These are categorized as enabling internal environment, organizing for quality, and providing support functions. It is incumbent upon each institution to ensure existence of the essential elements. Generally, the institutionalization process has four phases, which include awareness, experiential, expansion, and consolidation. The awareness phase is predicated on internal and external quality assurance requirements. The university experimented with various quality management systems. It also experienced numerous challenges, which included insufficient human capacity, cultural issues, inadequate resources, costly and cumbersome external quality assurance requirements and heavy quality assurance workloads. It is recommended that institutions of higher education institutionalize quality assurance by focusing on the essential elements that are established during the implementation phases.

Keywords

Analytical Framework, Essential Elements, Higher Education, Institutionalization, Quality Assurance

Introduction

The concept of quality and its application have been topical in higher education for quite some time. Since the turn of the 21st century, higher education has undergone major reforms in many countries due to numerous forces (Kauko, 2006). The impact of globalization, internationalization, massification, emergence of private providers, and demand for changes in degree programs have motivated higher education stakeholders to seek new means for assuring and improving academic quality (Woodhouse, 2006; Dill, 2007). Issues of operational efficiency, accountability, and improvement are paramount in higher education (Meek & Davies, 2009; Manatos, Sarrico, & Rosa, 2017).

The inadequacies of both the traditional internal and external practices for assuring academic quality in higher education include limited participation of external stakeholders and lack of focus on accountability and improvement (Brennan & Shah, 2000; Materu, 2007). Traditional internal quality assurance (IQA) practices have been dominated by the time-honored collegial systems of quality assurance (QA). The core of external quality practices was the use of external examiners and peer reviewers. The observation by Ncayiyana (2006) cited by Materu (2007, p. 17) puts things into context and helps to lay the foundation for the emergence of new QA systems. As cited by Materu (2007, p. 17), Ncayiyana (2006) stated that:

"Higher education could no longer continue with 'business as usual.' The old collegial model of quality assurance could no longer be relied upon solely to ensure that the public was being well served, or that the taxpayer was getting value for money."

New QA practices have emerged in higher education. There is a sustained search for quality management frameworks that promote innovation in academic programs as well as improve academic standards (Dill, 2007). The dichotomy of new QA approaches consists of external and internal QA mechanisms. These are referred to as IQA and external quality assurance (EQA). IQA refers to policies and practices used by higher education institutions (HEIs) to monitor and improve the quality of their education services, while EQA refers to supra-institutional policies and practices whereby the quality of HEIs and programs are assured (Dill, 2007).

One of the most notable developments in higher education has been the institutionalization of QA. It is now a truism that HEIs have established QA portfolios run by QA professionals. Various quality management systems (QMS) are in vogue in HEIs. Most of the QA models used by HEIs have been adopted or adapted from industry (Niedermeier, 2017). Some of the QMS frameworks in HEI include Total Quality Management (TQM), ISO 9001, the European Foundation for Quality Management Excellence Model (EFQM), balanced scorecard (BSC), Malcolm Baldridge award, and SERVQUAL, among others (Becket & Brookes, 2008; Niedermeier, 2017).

Institutionalization of QA has led to establishing structures for QA and formulating QA policies and procedures. QA processes such as evaluation, audit, benchmarks, and accreditation are now common in HEIs. This includes the Chinhoyi University of Technology (CUT) in Zimbabwe. The university has gone through the processes of institutionalizing QA. Its experience can make a significant contribution to IQA in higher education. The objective of this article is to disseminate the experience of the university and contribute to the body of knowledge that guides institutionalization of QA in HEIs.

Concept of Institutionalization of QA

Higher education providers are institutions that offer educational services. March and Olsen (2005) defined an institution as a set of formal and informal rules, norms, values and ideas that structure and guide social action. An institution has specific structural and systemic characteristics. Scot (2008) identified three elements constitutive of an institution as the regulative, normative, and cultural-cognitive elements. Examples of these elements in higher education are provided in Table 1. It is important to note that QA practices in HEIs are governed by an ecosystem of disparate regulations, standards, codes of good practice, responsibility, and accountability structures.

Institutionalization is a process through which new, initially ambiguous, unfamiliar, and resisted ways of doing things become structured, desirable, appropriate, comprehensible, commonplace, and routinized (Colyvas & Powell, 2006; Scott, 2008). It leads to acculturation of QA in institutions. There are many different interpretations of the term QA. UNESCO defines QA as the continuous process of evaluating (assessing, monitoring, guaranteeing, maintaining, and improvement) of higher education systems, institutions, or programs (Vlăsceanu, Grunberg, & Parlea, 2007). Put together, institutionalization and QA in HEIs are embodied by the establishment of IQA systems. A development associated with institutionalization of QA has been professionalization of quality management and use of well-defined QMS by HEIs. Institutionalization of QA in higher education has largely been driven by the influence of quality management practices in industry (Ewell, 2002).

Table 1: Examples of Regulative, Normative, and Cultural-Cognitive Elements of IQA

Element*	Descriptors*	Examples for IQA
Regulative	• Embodied in various types of regulations. • Operationalized by logic of instrumentality and consequence.	• Structures for IQA management. • QA objectives and policies. • Quality management system.
Normative	• Codes of conduct. • Core values. • Socially appropriate behavior.	• Institutional core values. • Guidelines of good practice. • Standards.
Cultural-cognitive	• Understanding the roles and processes. • Understanding the taken-for-grantedness of rules and practices.	• Quality manual. • Capacity building. • Documentation.

*Scot, 2008

Using the institutional development theory, various institutions will always be at different places on the institutionalization of QA continuum. Colyvas and Powell (2006) suggested that a distinction can be made between situations of low, medium, and high levels of institutionalization. The differences are measured in terms of levels of development and maturity of the regulative, normative, and cultural-cognitive dimensions in an institution with reference to IQA.

Analytical Framework for Institutionalization of QA

Theoretical and analytical tools are useful instruments in any type of analysis. As such, an analytical framework is needed in order to characterize institutionalization of QA in HEIs. The basis of the framework is to define a roadmap for institutionalizing QA. Available analytical frameworks include those by Colyvas and Powell (2006) and by Piper (2007), which define the institutionalization process as sequential stages. The stages include: not ready, preparing to institutionalize, institutionalizing, business as usual, and fully institutionalized (Piper, 2007).

One analytical framework used for the institutionalization of QA in higher education comes from the healthcare field (Abebe, 2014) and was developed by Silimperi, Franco, Van Zanten, & MacAulay (2002). The conceptual model was created to support the institutionalization of QA in healthcare. Its applicability to higher education has been supported by Abebe (2014), who described it as generic enough to apply to various sectors. The framework encompasses three core QA activities, which are defining quality, measuring quality, and improving quality (Silimperi et al., 2002).

The framework by Silimperi et al. (2002) has two major components—the essential elements for institutionalization of QA and phases of institutionalization (Askov, MacAulay, Franco, Silimperi, & Van Zanten, 2000; Silimperi et al., 2002). There are three essential elements (Silimperi et al., 2002), which include internal enabling environment (policy, leadership, core values, and resources); organizing for quality (structure); and support functions (capacity building, communication and information, and rewarding quality). These elements resonate with components provided by Srinivasan and Kurey (2014) as constitutive of quality culture (quality infrastructure, leadership, communication, ownership,

and recognition). The importance of the essential elements is that they must be in place for successful institutionalization of QA to take place. These can be regarded as the building blocks on which a quality culture is anchored.

The second component of the Silimperi et al. (2002) framework is the phases of institutionalization of QA. These are synonymous with growth and maturation phases. Silimperi et al. (2002) stated the phases as awareness, experiential, expansion, and consolidation. Silimperi et al. (2002) pointed out that the process is not linear and, in practice, the sequential order of the stages may not be followed. The descriptors of the phases, which are provided in Table 2, specify the activities associated with each phase of the institutionalizing process.

The awareness phase is preceded by pre-awareness, and the consolidation phase is followed by maturity of the system (Silimperi et al., 2002). It is important to note that both pre-awareness and maturity are states of a situation and are not phases (Abebe, 2014).

Observations and Experience of the University

This section shares the observations and experience of CUT. The analytical framework by Silimperi et al. (2002) is used to present CUT's observations and experiences.

Establishment of the Essential Elements

The eight essential elements, which are grouped into three categories (enabling internal environment, organizing for quality,

Table 2: Institutionalization Phase Characteristics

Awareness	Experiential
• Decision makers become conscious of the need to systematically address improvements in the quality of care.	• Organization trying approaches to learn and document results that QA leads to improved care.
Expansion	**Consolidation**
• Strategic expansion of QA activities in scale, scope, and implementation. • Increasing organizational capacity to conduct QA activities.	• Simultaneously strengthening and anchoring existing QA activities into standard organizational operations, while addressing lagging or missing activities.

Silimperi et al., 2002

Table 3: Setting up the Essential Elements for Institutionalization of QA at the University

Component	Element	Activities undertaken by the university
Enabling internal environment	1. Policy	• Formulated a QA policy using an inclusive process.
	2. Leadership	• Pro Vice Chancellor (academic) given overall QA responsibility. • Deputy deans designated as QA leaders at school level.
	3. Core values	• Institutional core values include excellence.
	4. Resources	• Financial, material, and human capital established.
Organizing for quality	5. Structure	• Established an IQA unit. • Established a QA committee as a sub-committee of Senate. • Established QA committees at academic department and school levels. • Established quality circles in support units.
Support functions	6. Capacity building	• Conducted training workshops for staff. • Sponsored attainment of professional QA qualifications by IQA staff.
	7. Communication and information	• QA information communicated via QA committee meetings. • Set up an IQA web page. • Produced various QA reports.
	8. Rewarding quality	• No formal mechanisms put in place.

and support functions), denote the prerequisites for successful institutionalization of QA. These are enablers that support the institutionalization process. CUT put the necessary systemic and structural components of the operational environment in place, as shown in Table 3. These activities show how the essential elements were established at CUT.

A notable point in Table 3 is the absence of formal mechanisms to recognize and reward quality. Silimperi et al. (2002) as well as Srinivasan and Kurey (2014) stated the importance of reward systems in institutionalizing QA. This is a good practice to adopt.

It must be noted that existence of the essential elements emboldened the process at CUT. The deliberate actions of university management, such as setting up an IQA unit and allocating resources, demonstrated evidence of top-management commitment.

It is also important to state that the eight elements are not a set of minimum or maximum conditions for institutionalization of QA. Rather, they are indicative of an operational environment that supports institutionalization of QA. The recommendation is to optimize conditions in which IQA operates.

Phases of Institutionalization of QA

Pre-Awareness Phase

The pre-awareness state was dominated by the time-honored collegial systems of QA. The main QA activity was the use of external examiners by academic units in the university. There were no formal structures or systems with direct responsibility for quality management. The university did not have well-defined QA policies.

Awareness Phase

As noted by Silimperi et al. (2002) and Abebe (2014), pressure from both internal and external stakeholders is a push factor. External stakeholders played a part in institutionalizing QA at CUT. The prime player was the Zimbabwe Council for Higher Education (ZIMCHE), which is a public, EQA agency. By way of statutes, ZIMCHE requires HEIs in the country to establish IQA units. It is thus important to point out the role of EQAs in institutionalization of QA in higher education through a regulatory framework and technical support to HEIs.

The IQA unit at CUT was set up in response to the requirement for formal QMS in higher education. The main change in the awareness phase was what Kinser (2002) called the "unbundling" of academic work where quality management became the remit of IQA. The main activities of the awareness phase were setting up structures and systems for IQA at CUT. This included putting the essential elements in place, which are provided in Table 3.

Experiential Phase

The main activity was establishing an appropriate QMS. CUT experimented with TQM, BSC, and the ISO 9001 standard. The IQA unit was responsible for making recommendations on the appropriate QMS to the university. CUT decided to adopt the ISO 9001 standard because of its robustness. The ISO 9001 standard may lead to formal certification and serve as a marketing tool. This standard is a popular choice for educational organizations (Thonhauser & Passmore, 2006; Rosa, Sarrico, & Amaral, 2012).

Expansion and Consolidation Phases

The expansion phase was characterized by quality audits aimed at ascertaining the existence of structures and systems for QA in all units of the university. Audits were used to identify gaps and take appropriate corrective action. Special focus was placed on enhancing students' levels of QA literacy. The consolidation phase is a work in progress as the university continues to strengthen its QA systems. The aim of the consolidation phase is to inculcate a deep quality culture in staff and students.

Challenges in Institutionalization of QA

The institutionalization of QA at CUT has not been without obstacles. There are several challenges that emerged at CUT. These include the areas of human capacity, culture, resources, workload, and EQA requirements as shown in Table 4.

It is worth mentioning that QA staff work at the nexus of academic and administration realms. MacFarlane (2011) called this the morphing of academic practice and the rise of the para-academic, and Whitchurch (2008) referred to it as the emergence of third-space professionals. Essentially, the QA workforce needs to be adequately trained in order to be able to execute its functions. HEIs need to embrace the third-space concept (Whitchurch, 2008), which regards quality management as a profession with its own logic and career pathways. The

recommendations, which are provided in Table 4, will go a long way in supporting institutionalization of QA.

Conclusion

Quality management is burgeoning in higher education. Institutionalizing QA in HEIs is a process that requires adequate management in order to produce the desired results. The primary intended outcome is a mature quality culture in a HEI. There are two main parameters involved in the process. These are the essential elements and implementation process. The centrality of the eight essential elements requires emphasis. It is incumbent upon HEIs to ensure that the essential elements are in place as a pre-requisite of the process. As demonstrated in this article, this can be done easily. Furthermore, the institutionalization phases show a transition toward establishing a mature QA system.

Table 4: Challenges in Institutionalization of QA at CUT

Focus area	Challenges	Recommendations
Human capacity	• Insufficient human capacity for QA work at the beginning. • Absence of clear career trajectories for QA staff. • Weak QA literacy between staff and students.	• Train staff in QA and set up a continuous improvement agenda for professional QA staff. • Design clear progression of career trajectories for QA staff. • Conduct QA capacity building for staff and students.
Culture	• Existence of a pervasive collegial culture. • Weak quality culture—culture of resistance to change. • Compliance culture without internalization.	• Ensure that managerialism is embraced by staff. • Build a QA culture through building QA knowledge bases. • Use participatory and inclusive approaches in QA work. • Reward quality.
Resources	• Insufficient resources for QA activities.	• Allocate sufficient human, material, and financial resources for QA activities.
Internal workload	• Onerous workload of QA activities. • Time-consuming QA mechanisms.	• Ensure availability of staff in IQA unit dedicated to QA work only. • Digitize the quality management system.
EQA requirements	• Time-consuming EQA mechanisms. • Costly and cumbersome audit and accreditation processes.	• Ensure cordial relationship between IQA and EQA. • Ensure that EQA activities benefit the institution (add value).

The institutionalization process is not without challenges. The main issue is to ensure adequate human capacity for QA work. Training and continuous capacity building are success factors. However, it must be noted that QA work exerts heavy workloads on staff. It is, therefore, important to manage the workload. A digitized QMS helps to balance QA work.

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Quality Approaches in Education

Call For Papers

The American Society for Quality's Education Division publishes the online, double-blind, peer-reviewed journal *Quality Approaches in Education*. The editorial team actively encourages authors to submit papers for upcoming issues.

The purpose of this journal is to engage the education community in a discussion of significant topics related to improving quality and identifying best practices in education and workforce development; and expanding the literature specific to quality in education topics. With the increased emphasis on quality improvement in education, *Quality Approaches in Education* engenders a conversation focusing on this topic, supported by manuscripts from the international education community of faculty, researchers, and administrators from different disciplines and professions. *Quality Approaches in Education* welcomes submissions of manuscripts from higher education, K-12, and workforce development. The journal also welcomes manuscripts from the student services arena, institutional research, professional development, continuing education, business affairs, and other aspects of education related to quality improvement. We encourage evidence-based analysis using quality approach-driven improvement of education.

The following types of articles fit the purview of *Quality Approaches in Education*:

- Case studies on how to improve quality in a college, school system, or workforce development program using evidence-based analysis, continuous improvement approaches, especially related to improving student retention and degree completion.
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- Case studies or research articles addressing issues such as the role of faculty, administrators, and trainers in quality systems.
- Case studies or research studies focusing on the role of quality in accreditation.
- Case studies demonstrating best practices and systems thinking in education using the *Baldrige Education Criteria for Performance Excellence*, Lean Six Sigma or other national quality models, standards from the Council for the Advancement of Standards in Higher Education (CAS), or national frameworks and protocols, including preparing K-16 teachers for teaching in the 21st century learning environment.
- Case studies or research studies on scholarship of teaching and approaches to improve teaching, enhancing and supporting student learning, learning outcomes assessment best practices, and best practices for using technology in the classroom.
- Case studies or research studies on how student service units and intervention programs impact the quality of student experience and student learning.
- Case studies or research studies specific to collaboration with industry on STEM education through internships, co-ops, and capstone experiences for providing experiential and deep learning experiences and preparing students for STEM careers.
- Research studies on how education practices impact the quality of student life and student success for different student populations, including underrepresented groups, first generation in college students, and students from low-income families.
- Case studies that highlight the emerging improvement science for education and the continuous improvement cycle.
- Significant conceptual articles discussing theories, models, and/or best practices related to quality in higher education, K-12, and workforce development.

NOTE: We may dedicate an issue to a special topic to highlight areas of high interest in the field of education.

Articles generally should contain between 3,500 and 5,000 words and can include up to six charts, tables, diagrams, illustrations, or photos of high resolution. For details, please check the "Author Guidelines" at:
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Articles in *Quality Approaches in Education* generally should contain between 3,500 and 5,000 words and can include up to six charts, tables, diagrams, photos, or other illustrations. See the "Submission Format" section for more detail.

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Author Guidelines

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We log all article submissions into a database and delete all references to you. These "blinded" versions then go to the editorial review team for comments and recommendations. Both author(s) and reviewers remain anonymous in this process. The review process takes approximately three months during which time the reviewers advise the editor regarding the manuscript's suitability for the audience and/or make suggestions for improving the manuscript. Reviewers consider the following attributes:

1. Contribution to knowledge: Does the article present innovative or original ideas, concepts, or results that make a significant contribution to knowledge in the field of quality in education?

2. Significance to practitioners: Do the reported results have practical significance? Are they presented clearly in a fashion that will be understood and meaningful to the readers?

3. Conceptual rigor: Is the conceptual basis of the article (literature review, logical reasoning, hypothesis development, etc.) adequate?

4. Methodological rigor: Is the research methodology (research design, qualitative or quantitative, methods, survey methodology, limitations, etc.) appropriate and applied correctly? For a conceptual paper, is the framework appropriate and applied correctly?

5. Conclusions and recommendations: When appropriate, are the conclusions and recommendations for further research insightful, logical, and consistent with the research results?

6. Readability and clarity: Is the article well organized and presented in a clear and readable fashion? Is the article written in English and in a grammatically acceptable manner?

7. Figures and tables: When submitted, are the figures and/or tables used appropriately to enhance the ability of the article to summarize information and to communicate methods, results, and conclusions?

8. Organization and style: Is the content of the article logically organized? Are technical materials (survey scales, extensive calculations, etc.) placed appropriately? Is the title representative of the article's content?

9. Attributions: Are the sources cited properly using APA style? Are attributions indicated properly in the reference list?

You should use these attributes as a checklist when reviewing your manuscript prior to submission; this will improve its likelihood of acceptance.

Review Process Outcomes

There are three possible outcomes of the review process:

- Accept with standard editorial revisions. In this case, the content of the article is accepted without requiring any changes by you. As always, however, we reserve the right to edit the article for style.

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Please note that after articles are edited for publication, we return them to you to approve the technical content. A response may be required within 48 hours or the article may be held over for a subsequent issue.

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Quality Approaches in Education

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   - Use the early paragraphs to summarize the significance of the research.
   - Make the opening interesting; use the opening and/or background to answer the "so what?" question.
   - Spell out the practical implications for those involved in education.

2. Detailed technical description of the research methods or conceptual/theoretical framework is important, but not necessarily of interest to everyone. The description should enhance the narrative or be critical to the understanding of the article's material.

3. Throughout the article, keep sentence structure and word choice clear and direct.

4. Avoid acronyms and jargon that are industry- or organization-specific. Try not to use variable names and other abbreviations that are specific to the research. Restrict the use of acronyms to those that most readers recognize. When acronyms are used, spell them out the first time they are used and indicate the acronym in parentheses.

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6. If the article cites cost savings, cost avoidance, or cost-benefit ratios, or provides the results of statistical evaluations, include an explanation of the method of calculation, along with any underlying assumptions and/or analysis considerations.

7. Access to any survey discussed in the manuscript is important for our review and must be included with the manuscript. Depending on the length of the survey, we may include the entire survey with the article.

8. When submitting an article that is based on qualitative methodology, please be sure to describe the research questions, the information that is the basis of the data analysis, and report the developing themes. Also remember to include text analysis as part of data analysis. Please include the protocols in a separate Word document; review of the protocols will be important in our technical review. Consider including the protocols in the methodology section of the manuscript, if they can be presented concisely.

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Quality Approaches in Education

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1. We accept only electronic submissions in Microsoft Word format. The first page should be a title page with the title, names of the authors, and their affiliations. The second page should be the start of the proposed article with the title and abstract (150 words maximum) at the top of the page. There should be no reference to the author(s) or affiliation in the text that follows. Instead of the name of a university for a case study, the text should state "the University". The margins should be one inch all around on 8½ x 11 pages with Word's one-column format, left-justified. The title and section titles should be 14-point bold Calibri font. The text font should use 11-point Calibri font and a line spacing of 1.5 is preferred.
   Section headings should be 12-point bold Calibri and left justified. Typical section names are: Abstract, Introduction, Background, Literature Review, Methodology, Results, Discussion, Suggestions for Best Practices, Summary or Conclusions, Recommendations, Future Work/Research, Acknowledgments, and References. The actual headings will depend on the focus of the manuscript. There may be two additional levels of sub-headings. The first set of subheadings would be left-justified with the first letter of each word capitalized and in bold, 12-point Calibri. The second level of sub-headings would be the same but in italics.

2. If you are familiar with the APA formatting, we prefer the APA format, but will accept a well-formatted manuscript following these already mentioned guidelines.

3. The manuscript should be between 3,500 and 5,000 words including the abstract, tables, and references. It should include no more than six tables or figures. If you feel strongly that more tables or figures are needed to support the manuscript, we ask that you submit the additional tables or figures and provide an explanation for including them.

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Book examples:

Veenstra, C., Padró, F., & Furst-Bowe, J. (eds). (2012). *Advancing the STEM agenda: Quality improvement supports STEM*. Milwaukee, WI: ASQ Quality Press.

Sorensen, C. W., Furst-Bowe, J. A., & Moen, D. M. (2005). *Quality and performance excellence in higher education*. Bolton, MA: Anken Publishing Company, Inc.

Journal article examples:

Dew, J. (2009). Quality issues in higher education, *Journal for Quality and Participation* 32(1), 4-9. Retrieved from http://asq.org/pub/jqp/past/2009/april/index.html

Plotkowski, P. (2013). Guest commentary: Real-World engineering education: The role of continuous improvement, *Quality Approaches in Higher Education*, 4 (1), 2-4. Retrieved from http://rube.asq.org/edu/2013/05/best-practices/quality-approaches-in-higher-education-vol-4-no-1.pdf

Reference example:

National Science Board. (2012). Science and engineering indicators 2012. Arlington, VA: National Science Foundation. Retrieved from http://www.nsf.gov/statistics/seind10/.

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