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Research and innovation in teaching and learning are prime topics for the *Journal of Instructional Technology and Distance Learning* (ISSN 1550-6908). The Journal was initiated in January 2004 to facilitate communication and collaboration among researchers, innovators, practitioners, and administrators of education and training involving innovative technologies and/or distance learning.

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In its first twelve years, the Journal logged over twelve million page views and more than two million downloads of Acrobat files of monthly journals and eBooks.

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Editorial

The future for education

Donald G. Perrin

Early in the history of distance learning, it was recognized that self-directed learners were much more successful and other-directed learners. More recently, it was realized that externally imposed discipline in early education was dumbing down students. Control and compliance was achieved at the expense of curiosity, creativity, exploration, energy and self-direction. What was good for the teacher was not good for the student or ultimately, the society at-large.

Today's education system was built to achieve what is now accomplished by computers and automation, migrant labor or low-cost workers offshore. The future for unskilled workers in industrialized countries is grim and getting worse. On the other side of the coin, there is a shortage of skilled workers in science, engineering and technology; medicine, health services and nutrition; and in research and development of new products and services.

In today's competitive world, employers require higher levels of learning. They are seeking entrepreneurs, innovators, problem solvers and inventors. The shortage can be solved for future generations by redirecting the creative energy that is currently zapped in first grade to create self-directed learners with curiosity, energy and problem-solving skills. The transition will be more difficult for older students because the dumbing down process must be reversed.

It is urgent to start now because so many future-oriented jobs cannot be filled by today's graduates. The enormity of this task – which requires revolutionary changes at every level of the educational system – is beyond the imagination, budgets and people resources of education alone. It will require the collaboration of education, business, industry, military, government, foundations and philanthropic entities to rebuild education for the 21st century. It is a national goal with high priority. It will require integration of many disciplines with creative and effective use of learning technologies.

In 1959, as a response to Sputnik, the U.S. Government funded the National Defense and Education Act (NDEA) to update curriculum and pedagogy, especially in science, mathematics and engineering. President Kennedy set a goal: ". . . before the decade is out, of landing a man on the moon and returning him safely to the earth." The National Aeronautics and Space Administration set out to develop and implement the Apollo space program. This was an enormous undertaking required extensive research and development. A similar approach will be needed to redesign and implement 21st century education.

In the fifty years since NDEA, there has been tremendous development in learning technologies: individualized instruction, interactive multimedia, computers and the internet, mobile communication devices, and digital access to almost every book, image, video, and information resource on the planet. We must redefine the goals of education based on these changes and prepare learners for the world of the future.

We must assess current and future needs and student capabilities; replace the grading system with individualized educational programs and criterion-based learning. We must utilize our technologies and human resources to achieve higher standards and higher levels of learning. Teacher training institutions must spearhead these changes for new teachers but, as with NDEA, there is neither time nor budget to retrain 3.5 million K-12 private- and public-school teachers in the USA. They will learn along with their students as they work with state-of-the art curriculum embedded in new learning technologies and learning management systems. Over time, teachers will assume more specialized roles based on their personal goals and competencies. Students will assume greater responsibility through self-directed learning.

Research and development, theory and practice, and new communication technologies for teaching and learning will, supported by creative thinkers, writers and media producers, social scientists and educators, provide the blueprint for dynamically adaptive learning systems for 21st century students, lifestyles and future careers. Revolutionary changes are needed to restore the leadership of American education in the global economy. This may even become part of a technology race for survival of this planet.

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Editor's Note: This is a valuable study because it raises questions and comes up with useful answers as a starting point for future research. It identifies key factors in learner success and provides guidance for teachers and administrators of distance learning programs based on student self-regulated learning. It explores pedagogy, self-esteem, social and financial factors that affect learning.

Influences on academic success in open distance learning: a South African case

Bernadette Geduld
South Africa

Abstract

Pass rates and drop out of open distance learning students are a problem, and a challenge for many higher education institutions. This problem necessitates research about the influences of student's self-regulated learning and other influences on their academic achievement. A sequential, two phased exploratory design (n=264) was used. Quantitative data were statistically analysed by means of factor analysis, multiple regression analysis and step by step regression analysis. Qualitative data from interviews were analysed with ATLAS.ti.6.0. Quantitative results indicate a weak correlation between the variables of self-regulated learning and academic achievement. Quantitative findings also revealed resource management and finance as the two outstanding influences that contributed to academic success of this group of students. Qualitative results showed the use of cognitive learning strategies, test anxiety, time management, information technology skills and English proficiency as influences on the academic success of this group.

Keywords: self-regulated learning, open distance learning, academic achievement

Introduction

Open distance learning (ODL) liberated people from illiteracy, intellectual impoverishment and improved their quality of life, as more people started to work fulltime and study simultaneously (Zuhairi, Wahyono, and Suratinah 2006, 95-99). In South Africa ODL is a response to the post-apartheid education and economic needs of communities, and a mechanism to promote access and diversification of students in higher education, specifically for human capital development in education (Pitsoe and Maila 2012, 17). Despite the flexibility, access and massification ODL offers, it does not guarantee academic success, since most learning takes place outside the institutions where demands and challenges may constitute barriers (Warrican, Leacock, Thompson and Alleyne 2014, 331). Many students struggle to make meaning of this learning practice where self-regulated learning (SRL) is critical for student success. 'Though the ideal ODL student applies SRL to achieve academic success, ODL institutions still need to recognise factors that influence success and offer relevant support'(Warrican et al. 2014, 331).

Improving and sustaining the success rate of students at South African higher education institutions is acknowledged as a national concern (Higher Education Monitor 2009, 14). The concern as well as the challenge is based on the fact that students who are not self-regulated set themselves up for failure when studying in the demanding environment of ODL. Unfortunately, it is often these very not self-regulated students who decide on ODL as a mechanism to improve their professional studies (Roberts 2007, 1). The student throughput of ODL students at North West University, for example, is satisfactory; however, it is a great concern for the researcher that many modules have low pass rates, and that some students only pass modules after a second or third examination (Geduld 2011, 2). Many unsuccessful students' studies are terminated, or they drop out. If these students are to succeed, proactive measures should be taken to understand the self-regulated characteristics they possess as well as other influences their academic achievement in ODL (Subotzky and Prinsloo 2011, 177).

Despite the increased growth in ODL, little research seems to have been done in South Africa to determine students' SRL and its influence on academic achievement. Most of the literature on ODL focuses on challenges of ODL institutions to deliver quality education via the technological development, quality assurance, cost effectiveness, student support, etc. (Tunjera, Mukabeta, Ramirez, and Zinyeka 2014, 574). Researchers have called for additional study of SRL both in traditional and online ODL environments (Makoe 2012, 65).

The increasing concerns and challenges pertaining to ODL students' pass rates (Coetzee and Oosthuizen 2013, 236) necessitate this research about the influences on academic achievement of ODL students. This research provides information that can be used proactively to support students who show signs of SRL profiles associated with lower academic achievement, and who struggle with other associating influences that negatively affect their studies. Such support could diminish the probability of failure and escalate the likelihood of academic success (Naidoo 2012, 7).

In view of the discussion above, the following research question arose: What influence this specific group of ODL students' SRL and their academic achievement?

Objectives

The aim of this article is to report on influences on this group of ODL students' SRL and academic achievement.

A theoretical conceptual framework is provided next to position ODL and SRL in context.

Theoretical conceptual framework

The theoretical conceptual framework provides a background to the ODL and the construct of SRL as a requirement for academic success.

Open distance learning

Definitions of ODL highlight a physical distance between the institution, lecturers and students which can be bridged by technology. ODL is also characterised by involvement of an ODL institution in the organisation, planning and development of study material and provision of student support (Unisa 2008, 2).

These characteristics of ODL hold implications for teaching and learning. The biggest difference between teaching in a traditional classroom and ODL is the direct presence of lecturers. Many ODL students are used to classroom instruction with direct teaching contact, and consequently still rely on concrete images and sounds used with verbal and nonverbal communication that supported them when information was transferred. Direct contact with students offered the opportunity for social comparison between students with regard to performance, problems and priorities, and gives students the advantage to learn from other students' questions, mistakes and insights (McKee 2010, 103).

With ODL, delivered in a mostly print based, second generation model, lecturers and students do not have visual cues that promote learning. A stimulating class discussion and monitoring of participation is difficult to attain, because spontaneity between the lecturer and students is constrained by technological requirements in communication (Parikh 2008, 2). Isolation due to distance also affects the motivation, unity and rapport among students, because they come from different communities, geographic regions or even countries (Coetzee and Oosthuizen 2013, 352).

In ODL, students should possess SRL skills to study amidst family and career responsibilities and to determine their own time, pace, place and resources needed to study. They must have the ability to control how, where, what and when they study (Zhoa, Chen and Panda 2014, 944) thus the use

of SRL skills are imperative for academic success. ODL students should furthermore be able to manage personal stress and possess intrinsic motivation, perseverance and technological skills as well as the ability to overcome the barriers presented by non-mother tongue education (Coetzee and Oosthuizen 2013, 352). 'It is clear that distance education is a highly learner-centred mode and involves self-regulated learning' (Zhoa et al. 2014, 944).

Self-regulated learning

SRL is a central concept in educational contexts, is a strong predictor of academic achievement (Kirmizi 2014, 447). SRL has been studied in various international contexts in relation to numerous variables like motivational beliefs, academic performance, online collaboration and persistence. In this study, SRL is viewed against the background of Zimmerman's (2000) model based on social cognitive theory.

The social cognitive theory regards humans as self-organised, proactive, reflective and self-regulated (Bandura 2001, 4; Cleary and Zimmerman 2004, 538). The basis of the social cognitive theory is that human functioning is the product of a dynamic interaction in a series of reciprocal interactions between personal, environmental and behaviour determinants. An individual's learning occurs in a social context and is thus influenced by all three determinants. Personal determinants entail, for example, a student's knowledge and goals which influence behaviour determinants such as persistence, self-observation and the adaptation of study methods. Environmental determinants entail social and physical structures which include lecturers, friends and family which serve as social support and models for SRL (Schunk, Pintrich, and Meece 2014, 146).

SRL is also described as an active, constructive process whereby students set goals, monitor, regulate and control their cognition, motivation and behaviour, guided and constrained by their goals and the contextual features in their environments, to achieve outcomes (Järvelä and Järvenoja 2011, 352).

A self-regulated student uses three important characteristics of SRL: self-observation, self-judgement and self-reactions (Nicol and McFarlane–Dick 2006, 199). 'Such students have the ability to maintain a positive sense of self-efficacy, establish a productive work environment, use social resources effectively, and experience a positive anticipation about the potential outcomes of learning new information and academic success' (Wirth and Aziz 2009, 4). 'The importance of SRL is emphasised by the need to not only develop students' subject content knowledge, but also their higher order thinking, critical thinking skills and lifelong learning to equip themselves to function in a changing world' (Järvelä and Järvenoja 2011, 352).

Zimmerman's (2000) three phase cyclical model of SRL acknowledges the reciprocal interaction among the person, his or her behaviour and the environment. Each phase includes a number of sub-processes that characterise each phase. In all three phases students use their academic goals as a benchmark to evaluate their learning (Isaacson and Fujita, 2006, 40).

The first phase, the forethought phase, refers to influential task analysis processes and self-motivational beliefs that set the stage for learning in a self-regulated manner. The forethought phase includes one's goal setting, selection of strategies and methods to assess one's self-efficacy, mastery or performance goal orientation, and interest in the learning tasks.

The performance or volitional phase represents all processes performed during learning and involves processes that influence concentration and performance. Zimmerman (2000, 18) distinguishes two categories of performance processes: self-control and self-observation. The performance phase includes one's control to exclude distractions and other competing attentions, self-instruction, use of learning strategies, self-monitoring, self-experimentation and self-recording of progress.

The self-reflection phase involves processes that occur after learning efforts. During this phase 'self-evaluation against a standard or goal, attributions to ability or effort, defensive or adaptive reactions, occur'. 'Self-reflections, in turn, influence forethoughts regarding subsequent learning efforts, thus completing the self-regulatory cycle' (Zimmerman, 2008, 178-179).
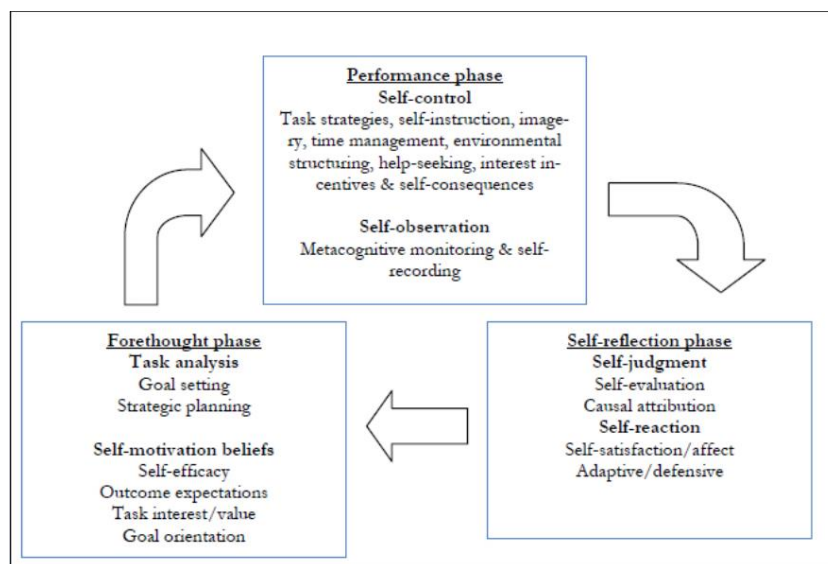

Figure 1 Phases and processes of self-regulated learning (Zimmerman 2000, 16)

Variables that influence students' use of self-regulated learning skills

Variables such as use of SRL strategies, learning disabilities, exposure to self-regulated behaviour, and apathy towards learning tasks can have a disabling impact on SRL. Dysfunctions in self-regulation are mainly caused by the students' ineffective use of planning, self-control, self-observation, self-instruction and self-monitoring when learning (Zimmerman 2000, 26). Instead of using proactive methods, less self-regulated students rely primarily on ineffective, reactive methods to manage their academic learning, thereby neglecting goal setting and task analysis. In such cases students rely on social comparison with peers to evaluate their own successes, which often leads to wrong interpretation of their failure or success, dissatisfaction with own performance and defensive reactions (Zimmerman 2000, 27).

Students with learning disabilities set lower goals, are impulsive and less accurate in assessing their own capabilities, are self-critical, and do not persist. Problems with concentration, recall, and poor reading and writing skills also lead to dysfunctions in SRL (Zimmerman 2000, 28).

Students who are not exposed to self-regulated behaviour, are deprived of social learning experiences, and this causes resistance to SRL (Zimmerman 2000, 27). Jing (2006, 97-98) found that students' resist the idea of SRL and merely focus on passing examinations when they had previous exposure to transmission instruction. In the same vein Isaacson and Fujita (2006, 41) state that students who studied at institutions where declarative knowledge was emphasised, struggle when higher order thinking skills and SRL are required in higher education, and become frustrated with their inabilities to adjust their learning strategies. Such students do not realise that different learning tasks require different strategies; therefore they overestimate their understanding of learning tasks (Isaacson and Fujita 2006, 41). When the use of different strategies is not valued in the teaching context, or when students lack knowledge to see the relationship between the strategy and the task requirements strategy use is inhibited (Hartman 2001, 34).

Students will only use their self-regulatory skills when the outcomes of their academic learning tasks have utility or intrinsic value; otherwise, demotivated students will make use of reactive self-regulation (Schunk et al. 2014, 64).

Based on the above-mentioned parallels between the requirements of ODL and SRL, an empirical study was done to determine to what extent these theoretical insights rightfully materialise in student learning. In the next section the research method and procedure will be discussed.

Methodology

A sequential, two phased exploratory design, (QUAN/qual) was used to gather data. Quantitative and qualitative data were analysed separately but are integrated in the conclusion and discussion phase (Creswell and Plano Clark 2007, 83). The researcher has a pragmatic, postpositivist worldview which is based on context driven and practical views suited to the research aim of this study. In the first phase quantitative data were collected to determine SRL, and other influences on academic achievement. No causal influences could be drawn as the study used an ex post facto, cross sectional design. With the second phase, qualitative data were collected from ten participants through semi-structured interviews after contact sessions at different ODL centres of the university. Many other possible influences on academic achievement could be identified with the qualitative data collection. It also deemed appropriate to better understand the quantitative data. To collect more information questions were selected and scenario's were adapted from Zimmerman's (1989, 337) fourteen strategies for SRL.

In the quantitative data analysis a Principle Component Analysis and Varimax factor analysis, correlation coefficients, a multiple regression analysis and step by step regression analysis (as an alternative to Structural Equation Modelling) was performed. The combined and individual contributions of eleven independent variables towards the variance of the dependent variable were analysed. Academic achievement was determined by participation marks, examination marks and module marks for the module LEON 611: Learning Perspectives, a compulsory module for all curricula in the BEd Honours program. The three sets of marks were used because the required fifty per cent pass rate for the final module mark is determined by these three marks. Academic achievement refers to the final grade and pass rate in the module, and was calculated as an average determined by their participation marks and examination marks. The researcher also wanted to determine whether SRL skills were used evenly with assignments and examinations.

The population in this study comprised all the ODL students for the BEd Honours programme at the Potchefstroom Campus. The criteria for selection was, irrespective of pass rate, a completed LEON 611 (Learning Perspectives) examination. Therefore a selected target group from the study population (n=264) who met the criteria was purposively sampled. Convenience sampling was also used to involve as many students from different provinces, race, gender, socio-economic groups and living conditions in urban or rural residential areas. Their participation was voluntarily. Respondents were informed about the purpose of the research and they were not subjected to any risk of stress. Their dignity, privacy and the confidentiality of data were respected.

Measuring Instruments

A biographical questionnaire provided information about influences on academic achievement, such as language preference, teaching experience, learning environment, year of study and barriers to learning.

A self-regulated learning questionnaire (SRLQ) based on Zimmerman's (2000) model for SRL was used in conjunction with the Motivated learning strategy questionnaire (MLSQ) developed by Pintrich, Smith, Garcia and McKeachie (1991). The MLSQ is composed of motivation sub fields, cognitive, metacognitive and resources strategies subfields. The Williamson (2007) self-directed questionnaire (SDLQ) comprises five categories: awareness and readiness to learn, learning

strategies, learning activities, evaluation and interpersonal skills, and was used to measure students' level of self-directedness during a learning process.

Semi-structured interviews were held to explore the participant's learning behaviour and ODL influences on their academic achievement.

Reliability and validity

The reliability of the questionnaires, calculated with Cronbach's Alpha coefficient was average and ranged from 0.57 to 0.89 (Petersen and Maree 2007, 216). Field (2009, 675) argues that reliability can even be lower than 0.7 when the diversity of the constructs that are measured is taken into account. The researcher attended to content and face validity (McMillan and Schumacher 2010, 175) and an empirical approach through a factor analysis was conducted to address construct validity (Pietersen and Maree 2007, 219).

The SRLQ was used to gather data about goal setting, strategic planning, self-observation, self-evaluation and self-recording. Goal setting (0.78) requires that students think about the outcomes they want to achieve, and that they focus their attention on relevant requirements of learning activities that must be performed to reach the stated goals. Strategic planning (0.87) refers to what should be done and how students plan time and strategies to attain the stated goals. Self-recording (0.87) refers to students' abilities to keep track of their progress during the execution of the learning task. Self-evaluation (0.78) refers to the self-initiated actions where students evaluate themselves in terms of goals or past performance. Self- reaction (0.72) refers to various reactions such as self-praising or self-criticism.

The MLSQ ascertained the extent to which learning success is influenced by motivational and cognitive orientations. The following variables were tested by the MSLQ: extrinsic goal orientation (0.65), task value (0.72), self-efficacy (0.78) success expectation (0.71) and test anxiety (0.67) that refers to negative emotionality relating to test-taking situations. Rehearsal (0.65) refers to learning through repetition and memorisation. Organisation (0.71) entails the ability to select key pieces of information during learning. Elaboration (0.83) entails the ability to synthesise information across multiple sources. Critical thinking (0.71) is the capacity to critically analyse learning material. Metacognitive strategies (0.83) refer to the capacity to self-regulate comprehension of one's own learning. Effort-regulation refers to persistence and effort when faced with challenging situations. Help-seeking (0.60) refers the tendency to seek help from lecturers or peers when experiencing difficulties. Peer learning (0.73) entails the tendency to work with other students in order to facilitate one's learning. Time and resource management (0.57) entails the capacity to self-regulate study time and resources.

The SDLQ is self-rating scale on self-directed learning and measured the following scales. Awareness and readiness to learn (0.84) refer to students' understanding of factors that contribute to their development as self-directed students. Learning strategies (0.86) are regarded as the cognitive strategies that students choose to attain goals. Learning activities (0.85) show similarities with learning strategies and focus on activities that students do during their learning experience. Evaluation (0.89) refers to the self-initiated actions where the students evaluate themselves in terms of the goals or past performance. Interpersonal skills (0.86) refer to the students' abilities to maintain good interpersonal relationships and maintain communication with fellow students.

To ensure credibility of the qualitative data, participants evaluated the accuracy of the transcribed interviews. The transcribed interviews as well as the process of coding, categorising and connecting themes were evaluated by an experienced researcher. In the next section the quantitative results will be discussed followed by the qualitative results.

Table 1   Correlation coëffisiënts between variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	DP	EP	MP
Extrinsic goal orientation	1.00																									
Task value	0.51	1.00																								
Self-efficacy	0.36	0.57	1.00																							
Success expectancy	0.49	0.61	0.63	1.00																						
Test Anxiety	0.09	0.01	-0.20	-0.13	1.00																					
Repetition	0.31	0.48	0.43	0.44	0.04	1.00																				
Elaboration	0.31	0.49	0.59	0.55	-0.10	0.51	1.00																			
Organsiation	0.30	0.46	0.49	0.55	-0.04	0.56	0.68	1.00																		
Critical thinking	0.26	0.41	0.47	0.48	0.05	0.46	0.64	0.57	1.00																	
Metacognitive strategies	0.33	0.48	0.54	0.56	-0.17	0.51	0.79	0.64	0.62	1.00																
Time and resource management	0.10	0.16	0.25	0.21	-0.31	0.18	0.39	0.30	0.24	0.48	1.00															
Peer learningr	0.18	0.20	0.26	0.23	0.14	0.29	0.34	0.37	0.43	0.35	0.20	1.00														
Help seeking	0.29	0.30	0.31	0.26	0.03	0.35	0.53	0.38	0.41	0.46	0.23	0.53	1.00													
Goalsetting	0.22	0.31	0.42	0.44	-0.06	0.46	0.53	0.48	0.51	0.54	0.32	0.35	0.33	1.00												
Strategic planning	0.28	0.24	0.35	0.35	0.03	0.37	0.53	0.49	0.49	0.52	0.24	0.35	0.36	0.76	1.00											
Self-recording	0.19	0.23	0.30	0.33	0.03	0.41	0.49	0.49	0.39	0.47	0.23	0.33	0.34	0.71	0.81	1.00										
Awareness and readiness to learn	0.18	0.36	0.40	0.46	-0.12	0.37	0.60	0.49	0.49	0.59	0.29	0.25	0.31	0.56	0.52	0.48	1.00									
Learning strategies	0.23	0.23	0.30	0.40	0.02	0.34	0.51	0.38	0.52	0.46	0.26	0.37	0.41	0.54	0.54	0.45	0.64	1.00								
Learning activities	0.28	0.34	0.46	0.39	-0.09	0.35	0.58	0.45	0.46	0.52	0.33	0.29	0.35	0.54	0.58	0.48	0.63	0.62	1.00							
Evaluation	0.32	0.28	0.31	0.36	0.01	0.34	0.56	0.46	0.50	0.52	0.23	0.33	0.39	0.55	0.58	0.48	0.67	0.67	0.62	1.00						
Interpersonal skills	0.31	0.26	0.30	0.34	0.01	0.29	0.47	0.36	0.42	0.41	0.19	0.36	0.39	0.50	0.54	0.42	0.56	0.63	0.57	0.72	1.00					
Self-evaluation	0.33	0.29	0.40	0.45	0.04	0.37	0.55	0.51	0.45	0.52	0.16	0.38	0.36	0.72	0.80	0.76	0.54	0.50	0.53	0.57	0.50	1.00				
Self-reaction	0.24	0.24	0.35	0.40	0.00	0.39	0.48	0.45	0.42	0.50	0.22	0.34	0.44	0.66	0.72	0.73	0.46	0.46	0.44	0.47	0.44	0.71	1.00			
Participation mark	0.10	0.16	0.15	0.13	-0.11	0.18	0.11	0.13	-0.01	0.08	0.07	-0.14	0.00	0.09	0.07	0.08	0.06	-0.04	0.03	0.06	-0.01	0.03	0.05	1.00		
Examination mark	-0.02	0.10	0.15	0.02	-0.12	0.06	-0.01	0.09	-0.01	-0.04	0.00	-0.20	-0.16	-0.06	-0.08	-0.05	0.02	-0.06	0.09	-0.02	-0.02	-0.10	-0.13	0.28	1.00	
Module Mark	0.03	0.16	0.18	0.07	-0.14	0.13	0.04	0.13	-0.02	0.01	0.04	-0.22	-0.12	0.00	-0.02	0.00	0.04	-0.06	0.09	0.01	-0.02	-0.06	-0.07	0.68	0.89	1.00

Results

To form a picture of the data which were used, excluding the biographical data, descriptive statistics and correlation coefficients were determined. Descriptive statistics indicated high average value scores (e.g. $\bar{x}$ =63.46; SD =12.79) in the sub-scales metacognitive strategies, learning strategies, learning activities, evaluation and elaboration strategies which influence important cognitive and metacognitive variables in learning. Respondents had high values in the motivation variables (e.g. $\bar{x}$ =37.37; SD =5.57) task value, self-efficacy, extrinsic goal orientation and success expectation. Respondents also demonstrated relatively high values (e.g. $\bar{x}$ = 50.06; SD =6.80) in awareness and readiness to learn and peer learning.

Table 2:

Contribution of best subset independent variables (R²) to participation mark:

R² = 0,1216 (R_a^2 = 0,08995)

Variable	Step	R	R_a^2	Contribution to R²	Total % variance reported	Variables included
Year of study	1	0.2009	0.040	0.0403	0,0404	1
Cognitive learning strategies	2	0.2584	0.026	0.0264	0,0668	2
Resource management	3	0.3022	0.018	0.0186	0,0913	3
Test anxiety	4	0.3097	0.010	0.0105	0,0959	4
Finance as hindernis	5	0.3258	0.010	0.0102	0,1061	5
Language wherein you think and solve problems	6	0.3382	0.008	0.0082	0,1144	6
Study hours per day	7	0.3487	0.007	0.0072	0,1216	7

Correlation coefficients were interpreted as <0.35 low educational significance, > 0.35 to <0.65, moderate educational significance and > 0.65 high degrees of educational significance (Cohen, Manion and Morrison 2007). The Pearson correlation coefficient between the different variables, and correlations with the participation mark, examination mark and module mark, revealed mostly low correlation coefficients between variables and all three dependent variables. There was a moderate correlation between extrinsic goal orientation and self-efficacy (r = 0.36) and between organisation and extrinsic goal orientation (r = 0.30). Strong correlations were determined between the self-regulated learning variables goal setting and strategic planning (r = 0.76), self-recording (r = 0.71), self-evaluation (r = 0.72) and self-reaction (r = 0.66), while the correlation coefficients between these variables and the respondents' participation mark (r = 0.09), their examination marks (r = -0.06) and total module marks (r = 0.00) were low.

There was not an educationally significant relationship between any of the independent variables and the academic achievement of the respondents. The correlation coefficients between their participation and examination marks were low (r = 0.28). There was a strong relationship between

the respondents' participation marks and module mark (r = 0.68), and between their examination mark and module mark (r = 0.89).

With the multiple regression analysis results the factor procedure of SAS-packet (SAS Institute Inc., 1996) was used to choose one variable from each of the eleven factors as representative of a factor for a certain number of related variables (Cohen et al. 2007, 560).

With the multiple regression analysis with the participation mark as criterion the basic set of variables that was introduced consisted of the eleven factors identified by the factor analysis and explains 12.5 per cent (R ^{2} = 0.1250, = 0.0743) of the variance in the participation mark. To determine the best subset of variables which contributed to the academic achievement in the participation mark a stepwise linear regression analysis were performed.

Table 3:
Contribution of best subset independent variables to R²:

examination mark R² = 0,1320, (R_a^2 = 0,1140)

Variable	Steps	R	R_a^2	Contribution to R²	Total % variance reported	Variables included
Resource management	1	0.3339	0.11	0.1115	0,1115	1
Age	2	0.3484	0.12	0.0098	0,1214	2
Care for children and dependents	3	0.3551	0.13	0.0046	0,1261	3
Finance as hindernis	4	0.3633	0.13	0.0059	0,1320	4

The best subset of variables consisted of seven variables that contribute 12.16 per cent (contribution factor R2 = 0:12:16) to the academic achievement of respondents. The individual contribution of year of study to academic achievement is 4 per cent (R ^{2} = 0.0403) which indicates a medium effect on the participation marks. The introduction of cognitive learning strategies in the regression equation increased the contribution of the group of variables with cognitive learning strategies to (R ^{2} = 0.0668). The individual contribution of cognitive learning strategies contribute 2.6 per cent (R ^{2} = 0.0264) to the variance on academic achievement. The contribution of the Year of study and Cognitive learning strategies to the participation mark is of low educational significance.

The contributions of Resource management (R ^{2} = 0.0186), Test Anxiety (R ^{2} = 0.0105), Finance as hindernis in studies (R ^{2} = 0.0102), Language where in you think and solve problems (R ^{2} = 0.0082), Study hours per day (R ^{2} = 0.0072) to the variance in the participation mark were small and the educational value of these variables are less. The contribution of both the total set of independent variables as well as the best subset of variables to the participation mark were small (respectively R ^{2} = 0.1250 and R ^{2} = 0.1216, or 05.12 and 16.12 per cent).

With the multiple regression analysis with the examination mark as criterion the best subset of variables that contributed to academic achievement in the examination consisted of four variables (Table 3). These four variables explained 13.20 per cent (R ^{2} = 0.1320, = 0.1140) of the variance in the examination.

Resource Management contributed 11.5 per cent (R ^{2} = 0.1115) to the examination mark was and were of medium educational significance. Age made 0.09 per cent contribution (R ^{2} = 0. 0098),

Caring for children and dependents 0.004 per cent (R ^{2} = 0.00046) and Finance as barrier in studies 0.059 per cent (R ^{2} = 0, 0590) to the examination mark. The effects of these variables were of little educational significance on the examination mark.

With the multiple regression analysis with the module mark as criterion the eleven factors identified by the factor analysis and explained 18.29 per cent (R ^{2} = 0.1829, = 0.1356) of the variance in the module mark. Nine variables contributed (R ^{2} = 0.1820, = 0.1436) of the variance in the module mark.

Table 4
Contribution of best subset independent variables to R²:
module mark R² = 0,1820 (R_a^2 = 0,1436)

Variable	Steps	R	R_a^2	Contribution to R²	Total % variance reported	Variables included
Resource management	1	0.3299	0.1088	0.1088	0,1088	1
Cognitive learning strategies	2	0.3520	0.1239	0.0150	0,1239	2
Year of study	3	0.3681	0.1355	0.0116	0,1354	3
Age	4	0.3821	0.1460	0.0104	0,1460	4
Finance as hindernis	5	0.3948	0.1559	0.0098	0,1558	5
Test anxiety	6	0.4065	0.1652	0.0093	0,1652	6
Care for children and dependents	7	0.4146	0.1719	0.0066	0,1718	7
Self-regulated learning skills	8	0.4202	0.1766	0.0047	0,1765	8
Language wherein you think and solve problems	9	0.4266	0.1820	0.0053	0,1819	9

Resource management had a medium effect on the module mark and made a 10.8 per cent contribution to academic achievement (R ^{2} = 0.1088). Cognitive learning strategies contributed 1.5 per cent (R ^{2} = 0.0150), Year of study, 16 per cent (R ^{2} = 0.0116) and Age 1,04 per cent (R ^{2} = 0.0104) to the module mark. Finance as barrier in studies (R ^{2} = 0.0098), Test anxiety (R ^{2} = 0.0093), Care for children and dependents (R ^{2} = 0.0066), Self-regulated learning skills (R ^{2} = 0.0047) and Language wherein you think and solve problems (R ^{2} = 0.0053) contributed even less to the module mark. Resource management was the single variable, with medium educational significance, that contributed the most to the academic achievement of the respondents as measured by the module mark.

In the qualitative part, content analysis was applied to analyse transcriptions. *A-priori* codes were selected from the interview questions, literature and from the authors own understanding of possible influences on academic achievement of ODL students.The following themes were

created: resource management, finance, test anxiety, time constraints, motivation use of SRL strategies, ability to work independent and language.

Discussion and conclusion

The aim of this article was to report on factors that influenced this group of BEd Honours ODL students' SRL and academic achievement. Data were collected via questionnaires and semi-structured interviews.

Low correlation coefficients were found between student's participation and examination marks (See Table 2). The conclusion can be drawn that the respective outcomes to be achieved, as well as the complexity and volume of content that must be mastered for assignments and examination, differ. Strong relations were found between the participation and module marks, as well as between examination and module marks. This can be explained on the basis that both the participation and the examination mark contribute fifty per cent per cent to the module mark. A high participation mark is thus to a student's advantage because the fifty per cent participation mark is included in the module mark. Next a discussion follows regarding the influences on the academic achievement of this group of ODL students.

From the data analysis one can deduce that quantitative results were confirmed by qualitative findings. Both quantitative and qualitative results indicated that resource management, cognitive learning strategies, year of study, age, finance, test anxiety, care for children and dependents, SRL skills, language and technological skills influence students' academic achievement. However, qualitative responses suggested that these variables have a greater influence on academic achievement as opposed to the low relations and medium effects indicated by the quantitative results.

Quantitative results indicated the strongest relations of all SRL skills between resource management and academic achievement. Resource management refers to students' abilities to manage personal, systemic and human resources as the required variables for SRL and ODL. This finding is supported by qualitative findings where students frequently mentioned lecturers, friends, family and peer group learning to assist with cognitively demanding content. Verbatim responses indicated that students struggle with the isolation caused by ODL and therefore perceived lecturers and peers as valuable human resources: *It helps to discuss the work with other people, especially the previous students…*

Besides resource management, quantitative results also indicated strong relations between finance and academic achievement. Similarly qualitative findings revealed that ODL holds financial implications and costs that are sometimes concealed. Five students mentioned the negative influence of financial constraints on their academic achievement. They explained that their family members were dependent on their salaries. With limited funds they experience difficulty in attending contact sessions and travelling to examination centres because of the high costs of transport. They are often not able to afford computers and Internet, or to pay for caretakers to take care of their children and dependants when they are busy with their studies (Geduld 2011, 262).

Furthermore, quantitative results showed that students' use of cognitive learning strategies influence their academic achievement. From student responses in the qualitative findings it became evident that they mostly used rehearsal to master content. A few participants mentioned imagery and self-questioning to process subject content and to prepare for examinations. In higher education higher order thinking skills and SRL are required, therefore limited use of cognitive learning strategies can have a negative influence on academic achievement. This finding is consistent with the report of Isaacson and Fujita (2006, 41) discussed earlier.

The limited use of cognitive learning strategies might be related to the age and previous education of this group of ODL students. They were mainly middle aged, and were mostly exposed to rehearsal and memorisation as learning strategies. Quantitative results showed a relation to age, and to the examination and module mark of students. A few responses in the qualitative analysis also indicated students believe that their age influences their memory, reading and writing speed in examinations. One participant said: *My age is a problem. I do have problems forgetting. That is why I failed in the examination*. This finding is confirmed in literature that states lack of time and fear of failure (stemming from low self-efficacy beliefs in their academic capabilities) and their beliefs of the effects of ageing on memory, can result in anxiety (McGivney 2004, 37).

Both quantitative and qualitative analysis indicated the influence of test anxiety, care for children and dependents, study hours and time constraints on academic achievement, although qualitative responses suggested a bigger influence than the limited relations indicated by quantitative results. It can be concluded that these variables have a chain effect and tremendous influence on students' academic achievement. In the qualitative findings, students mentioned insufficient time for studies, non-attendance of contact sessions, failure to meet due dates and family and community obligations as negative influences on academic success (Geduld 2011, 257). One explained: *I have got so many work to do, for the school, at home, cooking, taking care of my small kid. It is pressure. Many things disrupt my study time...(sic.).*

Qualitative findings indicated that, despite these challenges, student's motivation enabled them to handle stress and anxiety. Responses indicated that motivation has a big influence on students' academic achievement. They perceive their motivation, intrinsic value for their studies and their ability to persist as positive influences on their academic success. One participant explained: *I tell myself that I'm going to make it. I want to be an education specialist. I will make sacrifices, because I want to have more knowledge and skills.*

Although the year of study was not identified as a theme in the qualitative analysis, quantitative results indicated it relates to academic achievement. It can be concluded that many students must adapt to the academic requirements of post graduate studies in their first year. They also need more support because many of them are less self-regulated, but develop in their second or third year of study (Geduld, 2011, 305). Quantitative results of the influence of SRL on their academic achievement revealed the following:

Contrary to existing literature, there is limited relation between the SRL skills and academic achievement of this group of students. In this study, the qualitative findings clarified why SRL skills (goal setting, strategic planning, self-observation, self-evaluation and self-recording) had limited relations to students' module mark. Responses indicated that many students struggle to work independently.They rely on lecturers and peers to provide guidance with goal setting, planning and task analysis. One student explained: *If my friends also do not have a knowledge of writing the assignment, then I call my lecturer. I think the time for the classes are too short (sic.).* Judging from the various responses, the conclusion can be made that external regulation from peers and lecturers influenced this group of students' academic achievement.

The question arises whether the low relationship between students' SRL skills and academic achievement could be caused by too much external regulation. Boekaerts (1999, 450) warns that many below average students are often academically successful as a result of external regulation. Such students wrongfully form the impression that they themselves have managed their learning efforts.

Similar to the limited relation between the SRL skills and academic achievement, quantitiave results indicated no relations between student directed learninfg (SDL) strategies and academic achievement. Although high mean scores were calculated for students' use of SRL skills (in the descriptive statistics) multiple and step by step data analysis revealed that SDL skills have no

relation to students' academic achievement. This could be an indication that many students are under a false impression of their SDL abilities.

Quantitative results revealed limited relations between the language wherein students think and solve problems, as well as English proficiency and academic achievement. However qualitative results suggested that English proficiency played a bigger role in the academic achievement of these students. One participant said: *The books are English and my English is not good. It is difficult to understand and it takes time to translate this high English... (sic).* Students reported that their poor English proficiency restricted their comprehension, and caused confusion and misinterpretation. This finding is supported by the reasons (Zimmerman 2000, 28) and Hartman (2001, 38) give for dysfunctions in SRL.

Findings of Hartman (2001, 38) also confirm qualitative responses on the use of information technology and academic achievement. Limited relations between the use of information technology and academic achievement were found in the quantitative data analysis.

Qualitative findings indicated students perceived problems with access to technology, the skill to search for relevant information for assignments and finances to pay for Internet and printing of documents as a major influence on academic achievement. This is how one student expressed his frustration: *I am technologically challenged. I struggle to send emails, or search and decide what is relevant for the assignments..(sic).* It seems that many older ODL students still prefer telephone contact for communication and the postal system for submitting and receiving assignments.

On the basis of the findings a few recommendations are made for ODL institutions and for teaching in ODL contexts.

Recommendations

Implications for ODL and e-learning theory

ODL institutions should consider financial costs as a crucial variable in the design and delivery of programmes. Although ODL is a promising strategy to widen access and to improve professional qualifications, problems arise when students are unable to afford the technological and other hidden costs of ODL. Therefore ODL institutions should offer more information regarding financial support available.

Implications for practice

Given the significance of resource management, which includes peer learning, the practice of SRL through co- and social regulation should be explored in the design of instruction. With peer learning co-regulation and socially shared regulation will be promoted when students become aware of their own and other group members' thinking, so they can combine and connect their ideas.

ODL students should also be made aware of, and continuously supported, to demonstrate personal agency for academic achievement. This implies students taking control and managing time, applying deep and strategic approaches to learning, fostering positive motivational beliefs in their own capabilities to decrease anxiety, structuring a suitable learning environment and strategic management of personal, systemic and human resources to attain success.

SRL and SDL skills should form part of module outcomes, teaching and learning activities and assessment in all modules. If students realise they will be assessed on task analysis, goal setting, learning strategies applied, monitoring and evaluation of their comprehension and progress, they will become aware of and concentrate on these skills too. Self-assessment will enable students to evaluate and reflect on the learning process. It is an important aspect of SRL and should be facilitated. Formative assessment should put forward high quality positive motivation that

increases students' self-esteem. Knowledge gained from students' assessed work must be used to improve instructional strategies. Individualized feedback, affective feedback, an interrogative style of feedback, and feedback on resources and SRL skills applied, will influence students' use of SRL and learning strategies to achieve academically (Geduld, 2011, 308-309).

Lecturers should be wary of maximum external support that could inhibit SRL. Students' age as well as English language barriers should be considered in the development of study material and in teaching. More guidance should be given to provide students with examination writing skills. The development of information technology skills can result in more effective use and control of time and other resources, as well as in the promotion of peer learning.

The small study population limits the external validity and generalisability of this study. Research that uses a larger population could yield different results. There is still a lack of research that focuses on advantages of co- and socially shared regulation of learning.

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Editor's Note: The transformation to information technologies is unevenly applied in educational systems because we are still training teachers and administrators, developing instructional media, and expanding school budgets to accommodate and optimize use of these new technologies. Sometimes transition is chaotic because educators are still learning how to use these new tools. Many schools do not yet have adequate resources for learning technologies.

Technology integration and field observation in a teacher preparation program

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Abstract

In the fall 2014 semester, 55 students enrolled in Block I of the elementary education program at The University of Texas – Pan American participated in 32 hours of field observation. The majority of the participants were Mexican American (95%) and female (82%). All participants were classified as juniors and enrolled in two sections of EDCI 3332: Teaching, Learning and Technology Integration in the Elementary School. Participants were asked to observe the use of technology during their field placements using a structured observation format that required students to collect data from several sources: 1) the school website, 2) the technology resources available to the teacher in the classroom, 3) a lesson observation, 4) a teacher interview, and 5) a technology coordinator interview. Results indicated a wide range of variability in terms of the technology resources available and professional development provided, and a lack of meaningful technology integration even when sufficient technology resources were available.

Keywords: technology integration, elementary education, field observations, k-12, pedagogy, field placement, mentor teachers, minority students, Hispanic, Latino

Use of digital storytelling to promote reflective practice in teacher education

Introduction

Although there is a need for students to be prepared to use technology in order to compete in the 21st century, the task of integrating technology into classroom instruction remains a challenge for many teachers. National technology standards as well as state level technology standards underscore the importance of technology skills for students. At the national level, the International Society for the Technology in Education (ISTE), has articulated the National Educational Technology Standards (NETS) for students, teachers and administrators. The NETS are organized around six strands: 1) creativity and innovation, 2) communication and collaboration, 3) research and information fluency, 4) critical thinking, problem-solving, and decision making 5) digital citizenship, and 6) technology operations and concepts (ISTE, 2007). In addition to the standards, ISTE has articulated 14 essential condition that need to be met for teachers to be able to effectively integrate technology (ISTE, 2007). Among the essential conditions are equitable access, support, and ongoing professional learning (ISTE, 2007). In terms of equitable access, not all classrooms are uniformly equipped with the technology tools and resources needed and there is wide variance among schools and school districts in terms of funding for technology resources. Some schools may have a one-to-one iPad program while others have only a few computers in the teacher's classrooms. It is ironic that while many students walk around with tremendous computing power in their pockets in the form in cell phones, iPads, and iPods they walk into classrooms with little to no technology. Further, many school policies prohibit the use of the technology resources students

bring with them into the classroom. To further complicate matters, some schools may have adequate resources but fail to provide training and support to enable teachers to use those resources (Oblinger and Oblinger, 2005). Lack of familiarity in using technology can be quite intimidating for teachers given that most students have grown up immersed in technology and are digital natives while many teachers are digital immigrants (Oblinger and Oblinger, 2005). While most teachers are comfortable with technology for personal use, they are left unsure about how to embed technology into their instruction and make it a meaningful part of their pedagogy (An and Reigeluth, 2012). Even in cases where teachers do integrate technology into their teaching many of the activities are teacher-centered and fail to place the technology in the students' hands to use in creative and innovative ways (An and Reigeluth, 2012). The use of teacher-centered strategies is problematic given that students who are highly familiar with technology demand instant access to information, have a low tolerance for passive learning activities, and expect technology to be an integral part of their education (Oblinger and Oblinger, 2005).

Researchers have investigated the issue of technology integration from several perspectives and found that teachers' attitudes toward technology play a vital role in determining how and to what extent they will integrate technology into their classrooms (Capo and Orellana, 2011; Howley et al. 2011). Other researchers have also identified teachers' experience with technology and beliefs regarding how beneficial technology is as strong predictors of technology integration (Fethi and Inan 2010; Miranda and Russell 2012; Wright and Wilson 2011). Teachers develop their attitudes toward and beliefs about teaching through their experiences in school as students and observers of other teachers. Thus, if the majority of a person's experience was spent in classrooms where technology was not used then that person may not value technology integration as a teacher (Pittman and Gaines, 2015).

Given the inconsistent integration of technology across schools in the United States, the purpose of this study was to investigate the integration of technology by mentor teachers during field observations in an elementary education program.

Method

Subjects

In the fall 2014 semester, 55 students enrolled in Block I of the elementary education program at The University of Texas – Pan American participated in 32 hours of field observation. The majority of the participants were Mexican American (95%) and female (82%). All participants were classified as juniors and enrolled in two sections of EDCI 3332: Teaching, Learning and Technology Integration in the Elementary School.

Instruments

Participants were asked to observe the use of technology during their field placements using a structured observation format that required students to collect data from several sources: 1) the school website, 2) the technology resources available to the teacher in the classroom, 3) a lesson observation, 4) a teacher interview, and 5)a technology coordinator interview.

With regard to the school website participants were asked to determine if the website provided information on how technology is used at a particular school and if so, what information was provided. In addition, they were required to look for information regarding any online tools/resources available to parents to monitor their child's performance and to identify the resources used.

The second section of the structured observation asked participants to answer several questions regarding the types of resources available to the teacher and students:

- What technology is available to teachers in terms of hardware?

- What technology is available to students in terms of hardware?
- What software is available to teachers?
- What software is available to students?
- Does the school use the flipped classroom policy?
- Does the school have a BYOD policy?

The third section of the structured observation asked students to specifically focus on the integration of technology into an actual lesson. Students were asked to observe a lesson from beginning to end using Gagné's Nine Events of Instruction and discuss when and how technology was integrated into the lesson.

In the fourth part of the observation, participants interviewed their mentor teachers to determine the requirements the school has for teachers them in terms of integrating technology, whether or not they were provided with training to use the technology resources available, the most challenging aspect of integrating technology into the classroom, and if they felt adequately prepared to integrate technology when they first began to teach.

In the fifth and final part of the observation, participants interviewed the technology coordinator to determine what measures the school uses to ensure the safety of its students and whether or not he or felt the technology resources available were adequate.

Procedure

To help students complete their field observation, the field observation office assigns various sections of courses in the teacher preparation program to a specific school. Professors work with the school to assign students to mentor teachers and arrange an orientation for students on the first day of field observation. Prior to the field observations, students were introduced to the Technology Assessment Survey and were instructed on what to focus on in terms of students and teachers' use of technology in the field. They were also given directions for interviewing their mentor teacher and the schools' technology coordinator. Students conducted observations and over a period of six days.

Results

Data from the structured observation revealed a large disparity in the type of and manner in which technology was integrated into the curriculum. The disparity in the technology integration policies at both schools was likely due to difference in socioeconomic status at both schools.

Each section of students was placed at one of two elementary schools in the Rio Grande Valley. One school (school B) was quite a bit more affluent and had a much more robust technology integration plan than the other (school A) as well as more resources available.

As is shown in table 1 below, the less affluent school did not provide any data regarding their technology integration policy while the other school provided a great deal of information regarding their technology integration plan. School B used the TLC[3] (Transforming Learning in the Classroom, Campus, and Community) framework which is a one-to-one policy in which each student is given an electronic learning device (iPad). Both schools used Skyward Family Access and Reading Renaissance; however, School B also used Blackboard. Skyward Family Access is an online resource parents can use to check their child's grades, attendance, classes, teachers, etc.

Table 1
School Website Data

Question	School A	School B
Does the website have information on how technology is used at that particular school? And if so, what information is provided?	No information provided.	Uses the TLC[3] framework, Transforming Learning in the Classroom, Campus and Community. This plan will place an electronic learning device into the hands of every student.
Are any software resources provided to parents to monitor their child's performance? If so what software does the school use?	Skyward Family Access, Reading Renaissance	Skyward Family Access, Reading Renaissance, Blackboard Engage

As is shown in Table 2, the disparity between the two schools becomes even more pronounced when looking at technology resources available. Teachers in school A have four desktops and one iPad per classroom while all students in school B have an iPad in addition to the resources provided in the classrooms such as smartboards, laptops, a projector, and a document camera. In terms of software, both schools use many of the same free online resources which school B using iPad apps as well.

Table 2
Technology Resources Data

Question	School A	School B
Technology available to teachers and students?	Four desktops and one iPad	**Teachers**: Laptops, iPad, mimio, projector, and elmo **Students**: iPad for every student
Software available to teachers and students?	**Teachers**: Starfall, Primary Games, Spartiko (bilingual students), Active Inspire, iCurriculum, iTunes, Ignite, **Students**: Waterford, Starfall, Spartiko, iStation, Reading Renaissance	**Teachers**: success maker, i-station, Think Through Math AR, Cengage Learning, Discovery channel **Students**: AIR Learning games, iPad Apps, AR, Think Central, iStation, Think Through Math, Starfall and Math Central.
Flipped classroom used?	No	Teachers were trained on how to implement a flipped classroom but they do not have to use it.
BYOD policy?	**Teachers**: Starfall, Primary Games, Spartiko (bilingual students), Active Inspire, iCurriculum, iTunes, Ignite, **Students**: Waterford, Starfall, Spartiko, iStation, Reading Renaissance	Required to bring iPads to school on a daily basis but no cell phones.

Table 3 shows data indicating how teachers integrated technology into their lesson. As can be expected more of the teachers at school B tended to integrate technology into their lessons; however, teachers at both schools used it to present information and provide practice.

Table 3
Lesson Observation Data

Question	School A	School B
At what point in the lesson did the teacher integrate technology?	Most teachers did not integrate technology into their lesson plans, some used overhead projectors during the lesson, a few showed videos online, and one used a game to provide practice.	Some teachers used the whiteboard, laptop, LCD projector, and Document Camera during a lesson.

Table 4 shows the results of the teacher interviews. When asked what requirements schools had for teachers in terms of integrating technologies, the teachers at school A said that while it was not required, incentives were provided and teachers were encouraged to integrate technology. The teachers at School B, in contrast, were required to integrate technology. Teachers indicated that technology must be integrated into all lesson plans, they must take students to the computer lab daily, and they must integrate iPads into their lesson plans. When asked about the training provided to use the technology resources available, teachers at both schools had roughly equal amounts of training. School A provided their teachers with training during one technology conference in the summer and one Saturday per semester. The teachers at school B were provided with six hours of technology training per year. When asked about the most challenging aspect of integrating technology, teachers at both schools mentioned technical difficulties, lack of time needed to become familiar with technology, the speed at which technology changes, and not having enough resources.

Table 4
Lesson Observation Data

Question	School A	School B
What requirements for teachers does the school have in terms of integrating technology?	It is not required but incentives are provided (e.g. an iPad), required in PDAS, not required but encouraged,	Lesson planning must include technology, teachers must take students to computer lab daily, must integrate iPads into lesson plans
Are teachers provided training on the technology resources that are available?	Yes training is provided for all hardware and software resources made available to teachers, technology conference in summer, and one Saturday per semester	Teachers provided with six hours of technology training.
What is the most challenging aspect of integrating technology into the classroom?	Most challenging aspect of integrating technology: technical difficulties, lack of time and speed at which technology advances, not enough technology resources available (four desktops), assumption that teachers already know how to use technology.	Most challenging aspect of integrating technology: technical difficulties, lack of time, and speed at which technology advances, not enough technology resources available.

Data in table 5 show the results of the interview with the technology coordinator. Among the questions students asked were how the school ensures the safety of students while participating in online activities. As the data show School B had a more robust approach toward online safety as it provided a six week course on internet safety for teachers while School A simply used the standard firewall and a password protected WiFi network. In addition, technology coordinators were asked if they felt the resources available at the school are adequate; both indicated that they did believe the school provided sufficient technology resources.

Table 5
Technology Coordinator Interview Data

Question	School A	School B
How does the school ensure student safety in an online environment?	Through a firewall and protected WiFi.	The school ensures the student's safety in an online environment by providing a six weeks course on internet safety.
Do you feel the technology resources available to you and to teachers are adequate?	Yes	Yes

Conclusions

This study highlighted several issues related to technology integration in the elementary classroom. The results of the survey highlighted the disparity in lack of access to technology among schools. While one school provided an iPad for every student the other only provided a few computers in teachers' classrooms. This disparity suggests that lack of equitable access to technology remains a problem and not all children and provided with the necessary access to acquire the skills needed to participate and compete in the 21st century. An interesting finding related to lack of equitable access is the finding that even students who may not have internet access at home or in the school do own cell phones and use their phones for access email and the internet (Home Broadband, 2010). The prevalence of cell phones among students of all socioeconomic levels suggests that educators need to focus on incorporating the use of mobile technologies in the classroom as opposed to prohibiting their use.

A second significant finding in this study is that in cases where teachers did have technology available to them in the classroom, they still did not integrate it into instructional activities. The lack of integration of technology despite its availability echoes findings Gray et al. that only 40% of K-12 teachers surveyed indicated that they used technology on a regular basis in an instructional setting. This finding underscores the importance of professional development for teachers not just the amount but the type. An and Reigeluth (2012) found that while current professional development programs do help improve teachers' technology knowledge; they are often too broad, not subject specific, cover too much content in one session, are often about technology that is not available to teachers, compress too much information into short trainings, and they often teach about technology that is not available to the teachers.

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Editor's Note: Introduction of a new technology should be monitored and data collected to ensure the desired results are achieved. What was the level of student engagement and achievement? Was training and technical support adequate? What courseware is available? What changes should be made to optimize results? Here is a detailed study that deals with these and related issues.

Lessons from the field that informs effective 1:1 Chromebook implementation at the secondary school level

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United State of America

Abstract

Many school districts implement costly 1:1 technology initiatives without truly knowing the perceptions from their stakeholders who utilize the technology most. The purpose of this study was to evaluate and learn from the implementation of a secondary schools 1:1 Chromebook initiative. The data collected for this research project was at a secondary school during the first year of a 1:1 Chromebook initiative. The data suggests the initiative had an overall positive impact upon exposure, use, and attitudes about technology. Themes were uncovered as lessons learned in the study. These lessons are intended to inform schools regarding improved implementation practices with future 1:1 technology initiatives.

Keywords: Chromebook initiative, technology adoption, technology integration, 1:1 laptops, 1:1 implementation

Introduction

In preparing students to enter this new and ever-changing workforce, "schools today are given the task of not only educating students with the three Rs of Reading, wRiting, and aRithmetic but also are expected to give students strong backgrounds in science, technology, global studies, and a diversity of '21st century skills' such as critical thinking, collaboration, agility, initiative, oral and written communication, analyzing information, and imagination" (Wagner, 2008). Computer technology and innovation are viewed as bedfellows in today's educational landscape as educators look to prepare students for careers that have not yet been invented.

Part of the challenge of preparing students for the future is revealed by the measuring tools which exist to determine "readiness" for post-high school-work. "Only 24% of graduates met all four ACT College Readiness Benchmarks, meaning that 76% were not adequately prepared academically for first-year college courses in English Composition, College Algebra, Social Studies, and Biology" (ACT, Inc., 2010).

Further confounding the issue, Miranda and Russell (2011) report that despite widespread investment in information technology during the 1990s, greater access to technology may not have translated into increased computer use. To maximize educational technology's benefits for student learning, organizational leaders must understand which factors contribute to increased use of educational technology (Miranda & Russell, 2011).

Technology and student achievement

Student engagement due to technology and their consequent achievement were found to be influenced by a number of factors as examined through the relationship between academic achievement and student engagement. Some key findings from these examinations by Grundmeyer (2012) and Apple Computer, Inc. (2005) follow:

- Students, especially those with few advantages in life, learn basic skills - reading, writing, and arithmetic - better and faster if they have a chance to practice those skills using technology.

- Technology engages students, and as a result, they spend more time on basic learning tasks than students who use a more traditional learning approach.

- Technology offers educators a way to individualize curriculum and customize it to the needs of individual students so all children can achieve their potential.

- Students who have the opportunity to use technology to acquire and organize information show a higher level of comprehension and a greater likelihood of applying what they learn later in their lives.

- Students with access to a broader range of resources and technologies can express their ideas more clearly and powerfully.

- Technology can decrease absenteeism, lower dropout rates, and motivate more students to continue their education after high school.

- Students who regularly use technology take more pride in their work.

Shapley, Theyehan, Maloney, and Caranikas-Walker (2008) contend that 1:1 computing is a tool that can bridge the gap between students who achieve at various levels. They believe the exposure to a similar technological tools both in and out of school will produce positive results for learning. No matter the quality or depth of implementation by the school or educators, the students' use of the laptop outside of school for learning-games and homework was the greatest predictor of achievement with technology (Shapley, Theyehan, Malony, & Caranikas-Walker, 2008).

A case for 1:1

Long gone are the days of Encyclopedia Britannica, the card catalog, or microfiche. A strong catalyst for the transition from paper-based materials to a digital footprint is rooted within technology as a whole, and from this world, there is no turning back (Friedman, 2005, p. 273). It was only recently that computers entered the world of education, and since then, stakeholders have witnessed the dependence upon them grow as the technology itself becomes cheaper, faster, and easier to access. "Many educators and policy makers believe that technology can be a catalyst for educational reform" (Crichton, Pegler, & White, 2012, p.23).

A challenge that is faced in bridging the productive citizen of tomorrow and student of today is how to create a student who is engaged. Engaging the learner becomes ever challenging, and without this engagement, any textbook or Internet resource is powerless (Lent, 2012, p.14). "Technology to the learner of today is all about engagement. It is in this way that we meet them in the middle, so to speak, and begin where they are in life outside of school. If you watch the intense look on a child or teen's face when they play video games, text, Skype, Facebook, Instagram, Twitter, watch YouTube, or juggle websites simultaneously with TV or conversation, you can clearly see there is a level of engagement" (Rosen, 2011, p. 15). Whether on a smartphone, video game or other laptop-based electronic device with or without the web, the individualization of instruction engages the learner, which is significant and indicative of the future (Dunleavy, Dextert, & Heneckert, 2007).

Students who are textbook-tied to learning face disadvantages that are significant and long-lasting. "If you are dependent upon a textbook, the disadvantages you face are great and your ability to problem-solve creatively is greatly diminished" (Lent, 2012, p. 174). Students using computers are put into workplace-like circumstances that require self-directed learning (much like students might find in video games), which, through independence and proper training (according to Reiss), helps prepare them for college and career-oriented experiences (Reiss, 2013, p. 61).

2. Background and context of study

The secondary school researched in this study served approximately 975 students in grades 9-12. Almost 2/3 of the secondary schools student body was open enrolled in from neighboring districts. The school had a free and reduced lunch population of approximately 43% located in a suburban setting in western Iowa.

In 1997, the first computer network was put together at the school. Devices in the hands of students began to become a priority due to the changing curriculum and graduation requirements during the late 1990's, with business education classes being a primary driver of technology integration. Black (2014) says, "Even before the push of technology education toward the middle school, several lab spaces were added across the district (in all buildings), all staff received laptops and the general emphasis of technology use was expanding tremendously, but mostly through the eyes of staff use."

"Technical Integration of English (TIE) classes took all of the typing labs utilizing typewriters and replaced them with computer labs" (Black, 2014). This system, 18 years ago, was the genesis of what would lead to the 1:1 Chromebook initiative in place today at the high school. "Technology at this point was not about collaborating, creating, researching or networking, it was still about the function of typing, as the Internet was not in place" (Black, 2014).

The evolution of technology in the district

The years 2005 to 2010 brought increased emphasis to adopt technology that was centered more on collaboration, research, and networking. A number of factors influenced district expansion toward the 1:1 Chromebook initiative, including infrastructure in the form of fiber-optic cable upgrades/expansion, physical desktop and laptop computer additions/upgrades, additional staffing for technology support, pressure from staff to increase technology use for efficiency in the classroom, and increased interest by students/families in having technology outside of school in the form of computers in their homes and cellular phones in students' pockets. As neighboring districts began to incorporate 1:1 technology into their curricula, the school district began to take note of this change and questioned the purpose, need, and desire for such technology to meet the needs of an adaptive and well-rounded learner in the classroom and at home. A survey was launched to gain feedback from staff, parents, and students regarding their readiness for a 1:1 computer initiative.

Using feedback to plan for 1:1 adoption

This survey data suggested that the district staff, parents, students, and other district constituents were indeed ready for a 1:1 technology platform. Part of the readiness was based on the fact that multiple other school districts in the area had already engaged adopted a 1:1 computer initiative. The need to provide tools equal or superior to these neighboring districts emerged and set the groundwork for increased technology integration right away. Careful budgeting and research led the school to implement increased networking capability using Google products – through a three-year transition from purchase-based email and data storage, to online email, sharing, and other resources through Google.

Provided are a few key insights from the survey that came to influence decisions and operations of a 1:1 program for the district. These specific insights were:

1. Of the families who responded with children in the school, 36.3% indicated they did not have enough computers at home for all family members to get their work done.

2. Many (89.2%) of the families who responded had high speed (cable/DSL) connections at home.

3. All four groups of respondents (administrators, staff, students, and parents) indicated they saw several important benefits of a 1:1 program.

Survey results indicated community members were positive about technology and 21st Century Core competencies. Staff were committed to developing technology-infused education for the advancement of their practice. Specific paths for professional development and new learning activities were revealed, and benchmarks for future studies were provided. From the perspective of school district administrators, the district had achieved a synergistic momentum to develop teaching and learning with technology, and the survey results provided data to build paths for progress.

Staging a 1:1 rollout plan

A plan was devised to implement the 1:1 Chromebook initiative through three stages:

- Stage 1 was an update to infrastructure through more wireless access points at the high school, staff updates/training for the Chromebooks, and an increase in support staff to help with the management of the Chromebooks. This occurred during the spring and summer of 2013. Staff were given Chromebooks during the summer of 2013 to prepare for use during the beginning of the 2013/2014 school year (Black, 2014).

- Stage 2 was to deploy 600 Chromebooks in grades 6-8 during trimester one of the 2013/2014 school year, where the machines would be physically kept at school when school was not in session. This would allow grades 9-12 a gradual check-out process that would flow smoothly. It would also allow monitoring/adjustment of the network in the schools as network traffic would increase significantly through this process (Black, 2014).

- Stage 3 was the actual rollout of the Chromebooks at grades 9-12 at the beginning of trimester two during the 2013/2014 school year. This included the teaching of laptop expectations to students and various homeroom lessons to emphasize proper use, storage, and care for the machines. Staff were provided professional development opportunities during the fall of 2013 to prepare for this initiative (Black, 2014).

Purpose of the study

The purpose of this study was to evaluate the implementation and training of a secondary schools 1:1 Chromebook initiative. This study replicated a similar undertaking by Dr. Don Johnson from Fort Calhoun Community Schools (Nebraska), which worked to identify and analyze the necessary data and use it to determine the success of the implementation process used to initiate a 1:1 Ipad program in a senior high school. Use of this data enabled the district to more effectively infuse the use of the Ipad into the delivery of instruction, thereby improving student achievement and technology-skill readiness for post-graduation. The study utilized Patton's Developmental Evaluation Model to assess the implementation of the processes used as the 1:1 Chromebook initiative was designed and implemented.

Conceptual framework

This study centered on a model that examines the effectiveness of the 1:1 Chromebook using the Conceptual Framework adapted from Saven-Baden & Howell-Major, (2013). Smyth (2004) defines a conceptual framework as "a set of broad principles and ideas taken from relevant fields of inquiry and use to structure a given paper, presentation, or research process." This process provides a scaffolding framework that keeps the research on track as the results from additional work/research toward a given goal emerge. Figure 1 depicts the primary concepts related to this study:

Lessons from the field that informs effective 1:1 Chromebook implementation at the secondary school level.
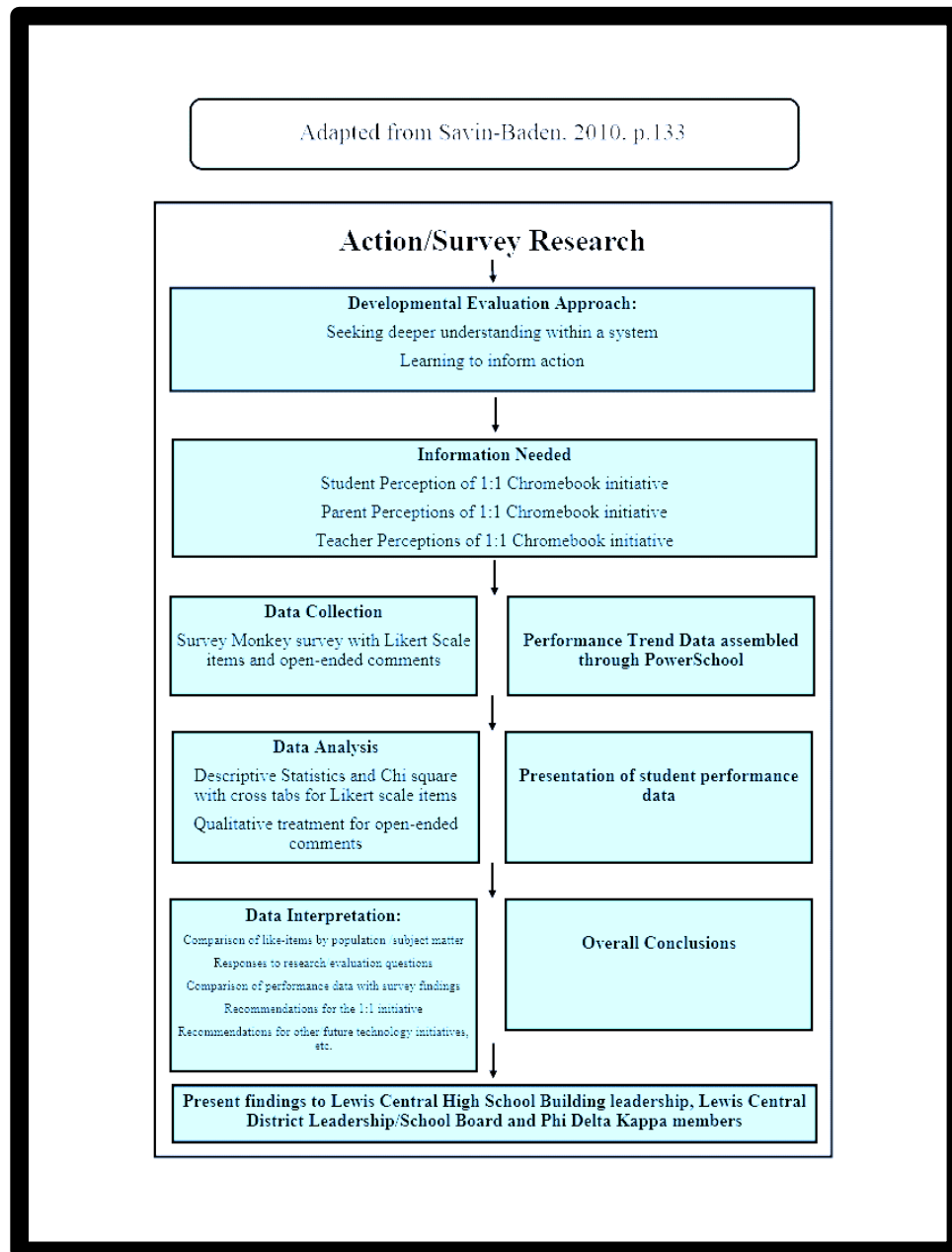
Andrew R. Walters

Trent A. Grundmeyer

Adapted from Savin-Baden. 2010. p.133

Action/Survey Research

Developmental Evaluation Approach:

Seeking deeper understanding within a system

Learning to inform action

Information Needed

Student Perception of 1:1 Chromebook initiative

Parent Perceptions of 1:1 Chromebook initiative

Teacher Perceptions of 1:1 Chromebook initiative

Data Collection

Survey Monkey survey with Likert Scale items and open-ended comments

Performance Trend Data assembled through PowerSchool

Data Analysis

Descriptive Statistics and Chi square with cross tabs for Likert scale items

Qualitative treatment for open-ended comments

Presentation of student performance data

Data Interpretation:

Comparison of like-items by population subject matter

Responses to research evaluation questions

Comparison of performance data with survey findings

Recommendations for the 1:1 initiative

Recommendations for other future technology initiatives, etc.

Overall Conclusions

Present findings to Lewis Central High School Building leadership, Lewis Central District Leadership/School Board and Phi Delta Kappa members

Figure 1.1 Savin-Baden Action/Survey Research Mode

Action/Survey research was used through Patton's model of Developmental Evaluation to elicit student, staff, and parent opinions in the spring of 2015 concerning the effectiveness of the district's 1:1 Chromebook initiative. The researcher sought to assess the effectiveness of the 1:1 initiative as it pertained to students, staff, and parents through qualitative analysis of data from open-ended questions. All three surveys also included an option for participants to provide anonymous, qualitative feedback about the effectiveness of the 1:1 Chromebook initiative.

Significance of the study

Providing effective tools that increase student engagement and achievement with relevance to their postgraduate plans has been a goal in education for many years. If technology helps bridge the gap between the learning that occurs in schools and the world that lies ahead of students post-graduation, then many districts are on their way to implementing a more relevant method for training and educating our youth.

This study has the potential to propel more students to greater success and post-school readiness through the acquisition of an education that includes tools for the "3 R's" and could also help students create, collaborate, and innovate through technology. In the past, people viewed education in relatively simple terms. Students went to school, hoped they were assigned good teachers, made the best of it regardless, and then moved on. Education as we know it today is a far more complex enterprise, and the stakes are higher than ever for both students and teachers. "All parties are keenly aware that they're being monitored and measured to acquire performance gains" (Ferguson, 2013).

If a school is to reinvest in technology after the lifespan of an initial technological tool has passed, student achievement results and post-graduate readiness must be central motivators for additional investment. Technology in schools is here to stay, and technology policy must be in a cycle of change as technology changes. Since the early 1990s, schools, districts, and the federal government have invested heavily in instructional technology (Miranda & Russell, 2011). The implications for all educators is clear through this study. If 1:1 helps student achievement, student engagement, and student preparation for college/military/careers, then it is a resource worth investing in. The findings will be used to evaluate and provide recommendations to the school in this study for future school improvement initiatives. The findings could also serve as a basis for other school districts to evaluate the effectiveness of technology.

Methodology

This study, generating both inferential and descriptive data, consisted of a cross-sectional survey to examine the opinions of parents, staff, and students. Cross-sectional studies examine practices, opinions, beliefs, and current attitudes about a particular topic given a specific group of individuals (Creswell, 2011). Since the 1:1 Chromebook initiative was new, a cross-sectional design served as the best tool to evaluate current practice and use. The survey consisted of stakeholders of the midwest secondary school that served a total of 975 students.

Design

To evaluate the 1:1 Chromebook initiative, there were three Overarchings that were the primary focus for the study. Within each of these questions were individual and more specific questions that addressed specific topics within each Overarching Question. Specific questions were used to formulate individual survey questions for each stakeholder using language, structure, and verbiage that was specific for parents, teaching staff/administration, and students. The Overarching Research Questions were as follows:

> What are the staff members' perceptions regarding the implementations of the 1:1 Chromebook initiative?

What are the students' perceptions regarding the implementation of the 1:1 Chromebook initiative?

What are the parents' perceptions regarding the implementation of the 1:1 Chromebook initiative?

The research questions were synthesized through various screens to determine the overall usefulness and effectiveness as a means to carry out this study. Creswell, (2011) advocates for "strategies for good question construction," as it helps to create "clear language...posing questions that are applicable to all participants" (p. 385). Careful consideration about all stakeholders, outcomes, and perspectives were all considered in the design of the actual research questions.

Instrumentation

Online surveys were used to obtain data from participants in the study. There were three surveys administered. The first survey examined student views, and was mailed electronically to 825 student users who were enrolled during spring of 2015. This survey included 12 Likert-scale study questions and two optional short answer responses, which allowed for reflection. The second survey examined parent views and was mailed electronically to 1,131 parent users with students enrolled during spring of 2015 (for whom email addresses were available). This survey included four Likert-scale study questions and two optional short answer responses. The third survey examined staff views, and were mailed electronically to 80 staff users who were either teachers, cooks, custodians, school nurse staff, or administration during spring of 2015. This survey included nine Likert-scale study questions and two optional short answer responses, which allowed for reflection.

Creswell, 2011, would advocate for a reduction in measurement error, using a good instrument with clear, unambiguous questions and response options. Johnson (2013) stated that a weakness of his study was the use of both four and five response option formats to multiple choice questions. This study made use of a consistent format in order to improve upon that weakness. The surveys were sent to all stakeholders at with the intent of reducing sampling error, as a large sample was selected from the population (Creswell, 2011).

Subjects

The survey populations included students, parents, and school staff members. All surveys were administered through *Survey Monkey*. Students were prompted to use their Chromebooks to take an electronically administered survey through *Survey Monkey* provided them during the school day during a shortened class period with permission of their instructors. The surveys were distributed through an email, delivered to their inbox with a brief introduction letter and with responses collected.

Data Collection

Data collection was completed using a *Survey Money* survey software. The researcher used data generated from electronic surveys completed by faculty and building level administrators, as well as parents and students. The survey was administered at the completion of the second full year of 1:1 Chromebook implementation.

Limitations

Although the data presented in this study is unique to the students, staff, and parents in the actual study at one Midwest school, one might assume that feedback from these same stakeholder groups in other school districts might be similar in regard to a 1:1 initiative. This limitation should be taken in context. Schools can use the Lessons presented, survey instruments, and research design as a possible model in evaluating their own technology initiatives.

Evaluation of data

Descriptive statistics (frequency, percentage, and measures of central tendency) were generated for each item of each survey. The responses to all open-ended questions were transcribed and reviewed for themes and patterns. For those open-ended questions with interesting responses, the Survey Monkey word map was generated. Survey results were then examined in relation to the student performance data (attendance, achievement) over time. This analysis did not presume cause and effect, but was considered in the interpretation.

Developmental evaluation must "offer questions that connect with the ideas, language, and framework of the innovators with whom you're working" (Patton, 2010, p 228). "Developmental evaluation is a way of being useful in an innovative setting where goals are emerging and changing rather than predetermined, and fixed time periods are fluid and forward-looking rather than artificially imposed by external deadlines, and the purpose is learning, innovation, and change rather than external evaluation (Patton, 2010, p. 318). "Developmental evaluation supports learning to inform action that makes a difference" (Patton, 2011, p.11). Through this research, the definitions of program evaluation and developmental evaluation were applied to the data gathered from stakeholders who have encountered various experiences related to the 1:1 Chromebook initiative.

Results

The response rate from stakeholders varied. Of the 825 students who were surveyed, 312 responses (37.82% response rate; 95% confidence level; 5% margin of error) were collected. Of the 1151 parents surveyed, 117 responses (10.17% response rate; 95% confidence level; 9% margin of error) were collected, and of the 80 staff members who were surveyed, 50 responses (62.5% response rate; 95% confidence level; 9% margin of error) were collected. Many households had emails sent to more than one parent, resulting in a lower response rate as one parent may have responded as the voice for the entire household. Implications for confidence level and margin of error could be skewed slightly because of the low response rate (10.17%) for the parent survey group.

Following are the data for all research questions presented in the order of the three surveys: staff, students, and parents.

Staff perception data

Out of the 50 staff responding to the survey, 17 staff members (34.00%) strongly agreed the Chromebook initiative is good for teachers, 22 staff members (44.00%) agreed the Chromebook initiative is good for teachers, and eight staff members (16.00%) indicated they were neutral. A total of three staff members disagreed that it is good for teachers, with two teachers (4.00%) disagreed, and one staff member (2.00%) strongly disagreed that the Chromebook initiative is good for teachers at the school.

Slightly over half of the staff agreed that there was sufficient professional development for training and preparation before students were issued the Chromebooks. Out of the 50 staff responding to the survey, nine staff members (18.00%) strongly agreed that there was sufficient professional training, 17 staff members (37.00%) agreed that there was sufficient professional training, and 12 staff members (24.00%) were neutral. A total of 12 staff members disagreed that there was sufficient professional training with seven staff members (14.00%) disagreeing, and five staff members (10.00%) strongly disagreed that there was sufficient professional training and preparation before students were issued the Chromebooks in 2013.

The amount of time teachers spent utilizing the Chromebook for students into their lesson plans is as follows. Out of the 50 staff responding to the survey, 14 staff members (28.00%) incorporated

the Chromebook into their lesson plans daily, 19 staff members (38.00%) incorporated the Chromebook into their lesson plans a few times a week, and five staff members (10.00%) indicated that they incorporate the Chromebook into their lesson plans once a week. A total of seven staff members (14.00%) incorporated the Chromebook into their lesson plans once every other week and five staff members (10.00%) incorporated the Chromebook into their lesson plans once every month.

There was agreement among staff that the Chromebook implementation was carried out using a reasonable timeline. Out of the 50 staff responding to the survey, nine staff members (18.00%) strongly agreed the Chromebook implementation was carried out using a reasonable timeline, 28 staff members (56.00%) agreed the Chromebook implementation was carried out using a reasonable timeline, and five staff members (10.00%) indicated they were neutral. A total of eight staff (16.00%) disagreed, as they indicate the Chromebook implementation was not carried out using a reasonable timeline.

There was a slight majority of staff that believe that there has been adequate ongoing professional development to properly educate staff since the Chromebook implementation. Out of the 50 staff responding to the survey, six staff members (12.00%) strongly agreed that there has been adequate ongoing professional development to properly educate teachers since the Chromebook implementation, 16 staff members (32.00%) agreed, and 14 staff members (28.00%) indicated they were neutral. A total of 14 staff members disagreed that there has been adequate ongoing professional development to properly educate staff since the Chromebook implementation with 11 teachers (22.00%) disagreed, and three staff members (6.00%) strongly disagreed that there has been adequate ongoing professional development to properly educate staff since the Chromebook implementation.

There was disagreement among staff concerning whether or not students are more engaged in their own learning progress because of the 1:1 Chromebook initiative. Out of the 50 staff responding to the survey, five staff members (10.00%) strongly agreed students are more engaged in their own learning progress because of the 1:1 Chromebook initiative, and 17 staff members (34.00%) agreed students are more engaged in their own learning progress because of the 1:1 Chromebook initiative, yet 17 staff members (34.00%) remained neutral. A total of 11 staff members disagree that students are more engaged in their own learning progress because of the 1:1 Chromebook initiative with nine teachers (18.00%) disagreed, and two staff members (4.00%) strongly disagreed that students are more engaged in their own learning progress because of the 1:1 Chromebook initiative.

A number of the staff did not feel that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time. Out of the 50 staff members responding to the survey, one staff member (2.00%) strongly agreed that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time; 13 staff members (26.00%) agreed that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time, and 11 staff members (22.00%) remained neutral. A total of 25 staff members disagreed that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time with 16 staff members (32.00%) disagreed and nine staff members (18.00%) strongly disagreed that at the time of the launch there were adequate safeguards, procedures, and guidelines in place to keep the students from misusing the Chromebooks during school time.

Staff suggestions

This was an open-ended question. Staff had common terms in their responses to this question, including the top three terms which were "teachers" with eight responses (32.00%), "technology" with five responses (20.00%), and "classroom management" with three responses (12.00%). This indicated that teachers would suggest districts should spend more time with merging the technology with more training/emphasis on classroom management. A total of 25 responses were gathered, and 25 respondents skipped the question. A portion of the comments that had a common theme among all responses are offered below:

1. I worked at another school that also did a 1:1 initiative prior to working here. I felt that my other school gave a lot more teacher preparation in setting up Google Classrooms and sharing useful apps prior to passing out the Chromebooks. Teachers were given a few months to get used to using them before students received their Chromebooks.

2. Making sure the network is supported. It was INCREDIBLY frustrating when we had network problems. It's not okay to have the network down for hours at a time when we've planned to use technology with students.

3. I think it would be worth the cost to implement a 1:1 program with a better quality device - i.e. laptop or MacBook. I would also love to see a classroom management program where students would have to log in through me and then I could monitor and disable their device.

4. Some of our most at-risk students cannot manage having technology in front of them. It becomes addictive and then I have had to take the Chromebook away and ask for alternative assignments.

5. The Chromebooks are nothing but a distraction for the kids in class to take away from learning. I was new to the district after the initiative and received no training on using them.

6. Again, the models we own are cheaply built. They feel cheap, the screens break easily, and less than two years into the initiative, the devices show serious signs of wear. Some of this is due to student misuse, but a lot of it is due to the design and materials used in the Acer model. It's important to note that it's easy for students to "check out" using these devices as well. Those who don't teach will say that teachers should be monitoring use. That's true, but if students are working online and helping individual students or small groups, they cannot see what every student is doing at all times. Many of them toggle back and forth between YouTube or Netflix and Google Classroom, Docs, etc. There are times when paper and pen is more efficacious than a Chromebook.

7. Students should be given not only the same Chromebook but also the same bag. Some students turned in a bag that was in great shape and were then returned a bag that smelled of smoke, full of pet hair, ripped, etc.

8. Not having some printing really slows down things. Business classes need to adjust to allow Workplace and Consumer Survival Skills to use Chromebooks.

Student perception data

Over half of the students believed that their technology use skills improved with the implementation of the Chromebook program. Out of the 312 students responding to the survey, 45 students (14.42%) strongly agreed that their technology use skills improved with the implementation of the Chromebook program, 136 students (43.59%) agreed, and 93 students (29.81%) indicated they were neutral. A total of 23 students (7.37%) disagreed and 15 students (4.81%) highly disagreed with the belief that their technology use skills improved with the implementation of the Chromebook program.

There was a strong agreement among students who believe that they use their Chromebooks for primarily academic purposes a majority of the time. Out of the 312 students responding to the survey, 100 students (32.05%) spent their use of the Chromebook for 90% academic and 10% non-academic purposes, 97 students (31.09%) spent their use of the Chromebook for 75% academic and 25% non-academic purposes, 84 students (26.92%) spent their use of the Chromebook for 50% academic and 50% non-academic purposes. A total of 22 students (7.05%) spent their use of the Chromebook for 75% non-academic and 25% academic purposes, and nine students (2.88%) spent 90% of their time for non-academic and 10% of their time for academic purposes.

A majority of students chose to remain neutral and a slight majority of students were in agreement about their perception of whether or not they learn more because of the use of the Chromebook in the delivery of instruction. Out of the 312 students responding to the survey, 36 students (11.54%) strongly agreed they learn more when they use the Chromebook during class; 75 students (24.04%) agreed, and 111 students (35.58%) indicated they were neutral. A total of 64 students (20.51%) disagreed and 26 students (8.33%) %) strongly disagreed with the idea that they learn more when they use the Chromebook during class.

Student suggestions

Students also had the opportunity to comment on the survey via open-ended questions. The comments that had a common theme among several responses are offered below:

- Find a core group of students that are proficient with technology and get buy-in from them. See that there are a sufficient amount of students to help the general student body with any technology needs.

- Pretty much I think we'd need a bigger talk about how careful we need to be with them. They break very easily. Also tell students not to be careless with the websites they get on in class because now we have so many websites that are blocked because kids are disrupting classroom time with games and online shopping, etc.

- I believe that all teachers should know how to deal with problems with the Chromebooks. Having to deal with a year of getting used to the new technology is expected, but it is frustrating when you get told to go to the tech office, and when you go down to the tech office, they usually tell you they are busy or they aren't there. Another issue is blocking every website. This hinders me, personally and academically, to do school work. (A personal thing was I was trying to be published and the website to get published was blocked.)

- If you slowly introduced the technology with the students and teach them how to use it properly, I believe you will have a better outcome in the long run.

Parent perception data

Parents reported a range of responses about their perception of the amount of time they saw their child using the Chromebooks at home for educational purposes. Out of the 117 parents responding to the survey, 24 parents (20.51%) saw their child use the Chromebook two or more times daily, 31 parents (26.50%) saw their child use the Chromebook daily, and 42 parents (35.90%) parents saw their child use the Chromebook a few times a week. A total of nine parents (7.69%) saw their child use the Chromebook once a week and 11 parents (9.40%) saw their child use the Chromebook once every few weeks.

There was strong agreement among parents who believe their children used their Chromebooks for primarily academic purposes a majority of the time. Out of the 117 parents responding to the survey, 67 parents (57.26%) saw their child use the Chromebook for 90% academic and 10% non-academic purposes, 21 parents (17.95%) saw their child use the Chromebook for 75% academic

and 25% non-academic purposes, and 17 parents (14.53%) saw their child use the Chromebook for 50% academic and 50% non-academic purposes. A total of seven parents (5.98%) saw their child use the Chromebook for 75% non-academic and 25% academic purposes, and five parents (4.27%) saw their child spend 90% of the time for non-academic and 10% of the time for academic purposes on their Chromebooks.

A majority of parents believed that the Chromebook was helping their student learn. Out of the 117 parents responding to the survey, 27 parents (23.08%) strongly agreed that the Chromebook was helping their student learn; 43 parents (36.75%) agreed, and 35 parents (29.91%) indicated they were neutral. A total of six parents (5.13%) disagreed, and six parents (5.13%) highly disagreed with the belief that the Chromebook was helping their student learn.

There was generally an agreement among parents that the Chromebook was helping their student prepare for the future. Out of the 117 parents responding to the survey, 33 parents (28.21%) strongly agreed that the Chromebook was helping their student prepare for the future, and 47 parents (40.17%) agreed, and 26 parents (22.22%) indicated they were neutral. A total of six parents (5.13%) disagreed, and five parents (5.13%) strongly disagreed with the belief that the Chromebook was helping their student prepare for the future.

The question posed to parents was, "Do parents have enough information about how the 1:1 Chromebook Initiative at this school operates? Why or Why not?" This was an open-ended question. Parents had common terms in their responses to this question, including the top three terms, which were "insurance" with five responses (9.09%), "parents" with four (7.27%) responses, and "student" with four (7.27%) responses. This would indicate that many of the responses about more information that was needed would center on the themes of parent and student procedures and the insurance offered by the school for the Chromebook. A total of 55 responses were gathered, and 62 respondents skipped the question. Comments that had a common positive theme among several responses are offered below:

- I believe this has been very beneficial - ended up purchasing a Chromebook at the close of school last year as my student had become dependent upon the capabilities/use and wanted that ability during the summer.

- I think we have information we can access if needed. I feel that I can always contact staff if I have a question.

- Yes. Just wish there was a way to check what kids are on. They know how to delete history on Chromebooks, which makes it hard for teachers to babysit.

The following themes suggested parents did not have enough information about the Chromebook initiative:

- My only knowledge is the insurance plan for it. I know nothing about how it is used in the classroom. Even conferences do not shine a light on how they are being used.

- I think that more information needs to be sent to parents about the insurance, what it covers, what it doesn't cover, and the cost (per item) if damages occur or straps or lost, etc. Information should be sent out in the beginning of the year to advise parents and also towards the end of the year as a reminder right before the Chromebooks and cords need to be turned in. It should include the cut-off date as to when they are due. To save money, email the information or post it on the website.

- I think we know that they are issued a Chromebook and it is our child's responsibility to keep it safe (or take the insurance). Beyond that, I don't know about the initiative. I think it would be smarter to get the kids into the programs they will be using in the future...Outlook, Word, Excel, and PowerPoint.

Parent suggestions

Parents had common terms in their responses to this question, including the top three terms which were "school" with 15 responses (25.42%), "kids" with 13 (22.03%) responses, and "think" with 12 (20.34%).

This would indicate that parent responses about the 1:1 Chromebook initiative would focus on their student, the role their student plays in the initiative and what they think about a specific topic. A total of 59 responses were gathered, and 58 respondents skipped the question. Comments that had a positive common theme among several responses are offered below:

- I think this is where technology is going, and the kids need the right tools to succeed.

- Although much of the curriculum is on the Chromebook, it does seem like there is still a lot of class discussion and social activities, which I'm happy about.

- I think that the Chromebook is very useful, and I'm glad that LC provides the students with them every year!

- I believe this has been very beneficial - ended up purchasing a Chromebook at the close of school last year as my student had become dependent upon the capabilities/use and wanted that ability during the summer.

The following comments that had a negative common theme among several responses are offered below:

I do not like having one more thing (the Chromebook) I need to keep track of. If it gets damaged or stolen, I'm liable and I wish the schools would have the students return them before the end of the day like the middle school does. Or at least give parents an option to make the student return it each day or not. We have a PC at home, so we don't need our child to keep it.

My student complains all the time that they do not work well: slow, crashes, can't get it to log on. May be time to update!

I don't believe the Chromebook is helping my student prepare for the future because of its many limitations. In college and in the work force, no one uses the Google products, but the Chromebooks are limited to those software products. Therefore, the kids are no longer learning to use the more widely used Microsoft products. Also, I don't believe that the students have the ability to back up files onto an external drive. When the school network goes down, the students become unproductive. Can't print at home from the Chromebook and sometimes teachers request that? Proxy errors sometimes prevent kids from using Chromebook at home. Parents should not be liable for damages.

Teachers are underutilizing the power of the Chromebooks. Student learning needs to be more transformative. I would love to see my daughter or son do something that extends outside the classroom walls.

You forgot that not everyone has access to Internet. Some in the district live in rural areas and have satellite Internet. Some may be not be able to afford the Internet. Although the teachers tell the students that the Chromebook will run without Internet, it doesn't do it well. I am not sure that the product was well thought out before it was bought. Teachers need to work on all the same software so students don't have to learn six different programs every term to find their assignments.

I think care of Chromebooks and dangers of cracked screens etc. must be looked at carefully. Other students can damage someone else's Chromebook easily, and they should be required to

pay for the damage since they do it. Have heard of instances of this from a few people. BETTER carrying cases or protections??

These seem like cheaply made computers. I keep hearing how they don't work even at school due to Internet issues. I feel that a quality product would have been a better long-term investment. We are fortunate to have Internet access at home; I still don't see how these will help a child who doesn't have that luxury at home.

Lessons and recommendations

This section highlights the triumphs and tribulations identified by the data in the study. Recommendations are made based on consultation of experts in the field, personal experiences of the researchers, and suggestions from stakeholders and school leaders themselves throughout the study. Both qualitative and quantitative data was used to formulated the lessons learned. The hope is that the lessons learned from the 1:1 Chromebook initiative highlighted in this study will provide guidance to others leading a 1:1 technology initiative.

Lessons learned from triumphs

Staff triumphs

The purpose of Overarching Question 1 was to determine the perceptions of the staff regarding the implementation of the 1:1 Chromebook initiative. Staff were in agreement or had positive responses toward items such as recommending the 1:1 Chromebook initiative for other districts, believing the Chromebook initiative is good for teachers, and believing the Chromebook initiative was carried out in a reasonable timeline. Staff had mixed reviews (overall favor toward agreement, but a substantial amount of disagreement) about professional development and the Chromebook initiative. They felt a need for more professional development for training and preparation before the students received them in 2013 and had mixed opinions about ongoing professional development concerning the 1:1 Chromebook initiative. Staff also had mixed reviews about students being more engaged in their own learning progress because of the 1:1 Chromebook initiative.

The majority of staff either disagreed or strongly disagreed that there are adequate safeguards, procedures, and guidelines in place to keep students from misusing Chromebooks during school time. Staff believe the Chromebook initiative was and is positive for students, yet room for improvement exists as the overall initiative moves forward.

- Each child regardless of parental background, socio-economic class, or experience with technology had equal access to technology and the world around them through the Chromebook as an interactive tool.

- Personalized and customized learning for students from different backgrounds and achievement levels was possible in and outside of the classroom using technology.

- Research, projects, and interaction with assignments became far more collaborative, with more resources available to students for assignment and self-discovery.

- Many teachers used technology on a daily and/or weekly basis as a means to aide in the learning process.

Student triumphs

The purpose of Overarching Question 2 was to determine students' perceptions regarding the implementation and use of the 1:1 Chromebook initiative through the 1:1 Chromebook initiative. Miranda and Russell (2011), report that despite widespread investment in Information Technology, greater access to technology may not have translated into increased computer use.

Educators in the school studied would tend to agree with the authors, in that to maximize educational technology's benefits for student learning, organizational leaders must understand which factors contribute to increased use of educational technology (Miranda & Russell, 2011). The overall findings with the Chromebook initiative would indicate that supports and systems have been put in place to increase the amount of technology use in and out of school. However, additional tech support and enhanced Internet accessibility could be helpful.

Students had a tendency to agree or strongly agree that their computer skills have improved since the 1:1 Chromebook initiative and that their skills at locating high quality information have improved since getting the Chromebooks. The majority of students report using their Chromebooks for academic purposes a majority of the time, with most students using their Chromebooks for academic purposes at least 75% of the time and non-academic purposes 25% of the time. Students had a tendency to remain neutral about whether classes were more interesting because of the Chromebook initiative and whether or not they tend to learn more when they use the Chromebook in class, though a greater majority still agree or strongly agree with both of these statements.

- In specific classes on a "general basis," the majority of students reported using their Chromebook daily in English and social studies classes. The majority of students reported using their Chromebooks a few times a week in Spanish and science classes. The majority of students reported using their Chromebooks approximately once a week in other elective classes, and finally, the students reported using their Chromebooks once a week or once every few weeks in math and arts classes. It is important to note that students and teachers in individual consultation concerning this initiative point to the nature of current practice, instruction, and outcomes in math, arts, and other elective classes. Many classes in these content area are project, outcome, or performance-based.

- Students and parents both agree that use of the Chromebook by the students is happening at home at least a few times a week, and that use of the Chromebook is at least 75% academic and 25% non-academic, and very often is 90% academic and 10% non-academic.

Parent triumphs

The purpose of Overarching Question 3 is to determine parents' perceptions regarding the implementation of the 1:1 Chromebook initiative. Parent perception was positive toward the use of technology through the 1:1 Chromebook initiative. The majority of parents see their students using the Chromebook at home for 90% academic and 10% non-academic purposes. This perception is directly in line with student perception, as they too perceive themselves using the Chromebook for 90% academic and 10% non-academic purposes.

Parents see their child using their Chromebook at home at least a few times a week, with many seeing their child using the Chromebook at home once, or two or more times daily. A majority of parents also believe that the Chromebook is helping their student learn and that it is helping prepare their student for the future. Another overall theme for parents was accessibility for all students to technology, as the open-response questions had many responses that thanked the district for implementing the 1:1 Chromebook initiative.

Lessons learned from tribulations

Lesson 1 - A significant concern from staff was the misuse of the Chromebook and the element of distraction it can cause in and out of the classroom. Parents also shared concerns about the role of technology in the students' lives, though parents reporting that the majority of the time they see their child using the Chromebook is for academic purposes. Students reported high actual use of the Chromebook in the majority of their classes. This included positive experiences through

application, technology creating a more informative and collaborative environment, and more creativity being allowed through the exploration of knowledge. Although there will always be some misuse of technology with a full 1:1 initiative, meaningful training, collaboration among teachers, and careful instructional planning to engage students with their devices will minimize the misuse and distractions that having the devices allows. A recommendation would be for school leadership to provide staff time to collaborate throughout the school year to allow networking and sharing of ideas for what works in and out of the classroom. This would be a good practice to share strategies and insight between educators to engage students with the technology as effectively as possible which would address concerns from both parents and teachers.

Lesson 2 - Staff were concerned about the rollout process. Many teachers did not feel adequate safeguards were in place to prevent students from misusing/abusing the Chromebooks. The recommendation to districts would be to engage the staff to be part of the rollout process fielding their feedback and expertise along the way. This would include having staff help develop both policies and procedures around the technology initiative. This would also include identifying what other districts have effectively done to manage the devices, communicate with parents, update policies and actually roll them out to students. Policies, clear procedures, and safeguards should be developed before 1:1 rollout. During the actual roll out to students, staff should be included so that they are engaged in the process, address questions, and see experience student feelings first-hand.

Lesson 3 - Staff, students, and parents voiced concern about the Chromebooks' role as it relates to being able to print and interact with other commonly used computer products such as Microsoft Word, PowerPoint, and Excel. Students and parents reported trouble with the durability/reliability of the technology, citing examples where it was broken non-intentionally, yet the family entity had to absorb the cost for repairs or replacement. They also reported systematic disparities, including turning in a Chromebook bag that was clean, and getting one the following year that smelled of smoke or other unpleasant odors. The recommendation would be to have the school reconsider the actual 1:1 device that is more durable and accessible for all students. The overall view of this type of technology and the school district would be more favorable with a different tool. Depending on the agreement between the school and the vender should lead to a timeline to adopt a more effective device.

Lesson 4- As adults come to the table with different technology backgrounds, so to do students. Some teachers are more technologically adept than many students and visa-versa. Class time does not always allow this gap to be bridged in a normal classroom setting. The recommendation would be to ensure that students have access to help regarding both hardware and software issues on their Chromebook. The school should consider a "Student Helpdesk" as it relates to not only maintenance and repair of the Chromebook, but also the use of programs within the Chromebook to complete projects. Districts that are planning a 1:1 technology initiative need also consider a help desk concept to support students when issues arise. Most often schools have student leaders who have expertise and time in their schedules to staff a help desk. Some schools have actually turned this experience into volunteer hours or even course credit.

The lessons learned from the 1:1 Chromebook initiative highlighted in this study should provide guidance to others leading 1:1 technology initiatives. School leaders can use the Lessons presented, survey instruments, and research design of this study to evaluate the perceptions and implementation of their local technology initiative. Only by continuing to evaluate these technology initiatives from the lens of students, staff, parents (and others) can the maximum benefits of technology initiatives truly be gained.

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Communication:
Key to effective organizational leadership

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Abstract

In this era of massive communication, leaders must find the most appropriate source to exchange messages through one or more channels and respond with written, verbal or nonverbal feedback. Communication plays a significant role in transmitting information in an organization. Rapid changes associated with changes in communication have occurred largely due to technology.

Over the years several schools of thought have developed based on classic thinkers.

Communication practices can embody various aspects from each perspective. Effective leaders must be able to manage and use ongoing communication to move the organization toward a common vision. Communication barriers and other problems associated with organizations can affect work productivity, morale, and employee satisfaction. This article addresses the importance of communication to effective leadership, organizational leadership, theoretical approaches, communication channels, use of technology, and communication barriers in organizations.

Keywords: Communication, leadership, organizations, theoretical approaches, communication channels, use of technology and communication barriers

Introduction

Effective leaders must possess communication skills, perform functions, and achieve goals for the organization. Clear understanding and efficient use of the communication process can provide leaders a formula to become more effective communicators. Communication is a key aspect of employee participation in organizations through which employees "share information, create relationships, and establish meanings" (Berger, 2014). Effective communicators are aware of verbal and nonverbal communication and avoid those that imply negative connotations. In contrast, ineffective communication may cause problems that can affect work performance, relationships, job satisfaction, and morale in organizations. Drafke (2006) emphasized that organizations can strengthen effective communication and decrease the number of barriers to communication by eliminating the impediments to effective communication through use of techniques like feedback, face-to-face communication, upward communication, and being considerate of others' needs and feelings. Effective leaders will identify best practices through repeated evaluation of communication in the organization for development of a common vision that focuses on critical outcomes for the organization. Collaboration and communication among stakeholders help to create an environment of trust and encourage employees to work cohesively toward common goals.

Leadership

Successful leaders provide clear instructions and have high expectations of themselves as well as their followers. Leaders can achieve top performance from employees by encouraging and supporting them toward the vision for the organization. Individuals need clear goals and feedback specifically through personal recognition (Kouzes & Posner, 2007). Leaders' experiences are

crucial for building communication skills that contribute to personal satisfaction of workers and the overall organizational effectiveness. When employees are satisfied with organizational communication they are more likely to be motivated and perform in an effective manner. Yukl (2006) defined leadership as the "process used to influence others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives" (p. 8). Leadership effectiveness is central to success in any organization.

Bennis (1984) described a leader as one who not only creates a vision, but also maintains persistence, consistency, and focus on achievement of the vision. Bennis (2007) stressed that leaders must have a vision that they can communicate and share with the followers. Today's leaders rarely interact directly with their followers. Bennis and Nanus (1986) argued that effective leadership can take organizations from present to future status, create a vision for the organization, encourage employee dedication to change, promote diverse cultures, and create new and innovative strategies in organizations. Bennis (1984) concluded that this could be achieved by encouraging people to actively participate in the vision of *tomorrow*. Northouse (2007) summarized leadership as a process "whereby an individual influences a group of individuals to achieve a common goal" (p. 3). The author also pointed out that these definitions suggest several factors essential to the phenomenon of leadership. Some of them are as follows:

1. Leadership is a process
2. Leadership involves influencing others
3. Leadership happens within the context of a group
4. Leadership involves goal attainment
5. These goals are shared by leaders and their followers (p. 3).

In recent years the importance of leaders' use of soft skills has significantly increased. Soft skills are often referred to as interpersonal skills or people skills. Leaders that have the ability to interact with others by solving problems, resolving conflict, demonstrate empathy, integrity, teamwork, persuasion, and communication skills are more likely to find a job, keep it, and make advancements in the workplace. In contrast, lack of soft skills can result in termination of employment. Hard skills are knowledge and expertise in a specific area and are expected of all leaders (Riggio & Tan, 2014).

Leadership depends on outcomes, use of hard skills, soft skills, and consequences of the leaders' activities for followers of the organization. Kouzes & Posner (2007) emphasized the importance to make recognition significant and to demonstrate that the leader genuinely cares about his followers, meaning that the leader must spend time being visible and getting to know employees. "Recognition and rewards do not necessarily have to be monetary; people appreciate a simple pat on the back and a thank you for a job well done".

It is important for leaders to have the ability to recognize the targeted audience and use appropriate language when communicating with the group to help eliminate misinterpreted or misconstrued information. When leaders fail to understand the culture of the audience, employees' perceptions as individuals and as a group will influence how receivers interpret messages. Establishing connections with stakeholders develop trust and creditability, which are vital components to effectiveness of a communicator.

Organizational communication

Communication is the most influential and important activity of an organization (Harris & Nelson, 2008). Communication occurs in the form of transfer of information, needs, and relationship; feedback is also a valued behavior (Bolman & Deal, 2013). Leithwood and Riehl (2003)

described organizational communication as the sending and receiving of messages among connected individuals within a specific environment to achieve individual and common goals. The authors stated that effective leaders focus on key characteristics of the organization's vision and communicate the vision clearly and convincingly. Koontz (2001) summarized organizational communication as the transfer of information from the sender to the receiver with the information being understood by the receiver. Communication in organizations needs to be sensitive in tone and voice to eliminate misinterpretation of messages. Use of a variety of communication methods can offer varied means of communication for diverse groups within organizations.

Goldhaber (1990) identified a number of common characteristics in the variety of definitions of organizational communication. Organizational communication:

1. occurs within a complex open system, which is influenced by, and influences its internal and external environments.
2. involves messages and their flow, purpose, direction, and media.
3. involves people and their attitudes, feelings, relationships, and skills (p. 20). Research reveals that the most productive channel of communication is face-to-face when compared to other sources such as email, voicemail, or fax (Hoy & Miskel, 2008; Moyer, 2011). Effective internal communication can create a healthy atmosphere of motivation, engagement trust, and sharing of thoughts and ideas (Moyer, 2011).

Theoretical approaches to communication

Numerous approaches and processes exist that stress different ways for communication and management to take place in the workplace based on how organizations should function for maximum effectiveness. The different approaches and processes used for organizational communications include classical, human relations, human resources, systems, and cultural approaches (Moyer, 2011; Bolman & Deal, 1991). The *Classical Approach* to management focuses on the structure and activities of an organization. This school of thought deals with concerns related to division of work, span of control, and the establishment of a hierarchy of authority. This concept was thought of as the utmost importance in the achievement of an effective organization. Two of the most significant scholars of classical theories were Henri Fayol and Frederick. W. Taylor developed in the 1800's. These leaders developed the foundations of ideas related to organization of people in the workplace and the organization of work itself (Cole, 2004).

Elton Mayo along with Fritz. J. Roethlisberger and William. Dickson developed the *Human Relations* movement in the 1920's and 1930's. The researchers conducted the Hawthorne experiment at the Western Electric Company in Cicero, Illinois (near Chicago). The study concluded that employees are not only motivated by financial rewards but also by social needs. The findings also pointed out that the more attention given to employees, the more likely their behavior would change. Social factors influence productivity, need for attention, social interaction, and individual achievement. Changes in the work environment impact productivity of employees in the workplace. These factors include recognition from management, job security, and the ability to speak openly about job related concerns with their supervisor. Mayo, Roethlisberger and Dickson also believed that effective leadership meant that leaders should strive to communicate with employees the importance to identify with the organization. This approach stresses that communication is a tool of management that helps to accomplish work through people, cooperation, participation, satisfaction, and interpersonal skills.

Encouraging interpersonal relationships among people in an organization are the role of the leader to achieve goals for the organization.

R. E. Miles developed the *Human Resources Approach* in 1965. This approach includes tasks and planning for organizations. Maslow's hierarchy concluded that human beings are motivated to satisfy their personal needs. This theory indicates that, if behavior is to be motivated, this must be done at the level of a need that is currently unsatisfied because a need that is satisfied is no longer a need and, therefore, is not effective as a motivator in the setting with which leaders are ordinarily concerned. Douglas McGregor (1960) and his Theory X and Theory Y also influenced this approach. Theory X and Y have different views of real world situations, based on different assumptions about people. Theory X views of people tend to believe that motivation is basically a matter of the "carrot and stick". While Theory Y is characterized by commitment to shared goals and high levels of trust, respect, satisfaction from work, and open relationships. McGregor focused on working the body, brain, and stress that most humans learn to accept responsibility. The human resources approach considers the skills, energy, commitment, and ideas of people as the most important resources for organizations. Employee independence, trust, and participation are characteristics of organizations (Owens & Valeskey, 2007).

The *Systems Approach* began in the 1970s. This approach describes organization behavior as a phenomenon that is well established in the sciences. This view of organizations was that complex organisms had a need to survive in challenging open environments. The process used in systems approach focuses on the overall functions, interrelationships, and behavior of individuals working cohesively to attain the desired vision for an organization. This approach urges leaders to view the organization as a collection of interrelated parts that function together to accomplish common goals. Leaders of this school of thought emphasize the idea that different means can be used to accomplish desired output (Miller, 2012; von Bertalanffy, 1968; Buckley, 1968).

The *Cultural Approach* was developed in the 1970s. Schein (1992) describes culture as a set of basic tacit assumptions about how the world is and ought to be that is shared by a set of people and determines their behavior, feelings, perceptions, and thoughts. This approach focuses on the importance of characteristics of organizations such as: beliefs, behaviors, language, practices, rituals, traditions, and values. This approach also demonstrates that through formal and informal channels, experiences, stories, and social activities organizational culture can be created and influenced (Moyer, 2011). Story telling is an effective use of this approach.

Communication channels

Channels are the means for transmission of messages. The sender and receiver are the common elements of all communication exchange. The sender initiates the message and encodes the message to determine the content by choosing the appropriate content, words, symbols, and gestures to develop a message. Use of the appropriate communication channels determines whether a particular message succeeds. Johnson and Johnson (2003) stated "to send a message effectively, the sender must phrase the message so that it will be comprehended, the sender will have credibility as a sender, and the sender will ask for feedback on how the message is affecting the receiver" (p. 140). Paraphrasing helps to clarify the message as understood by both the sender and the receiver. This takes time but it may prove to be an effective approach to communication.

The message is transmitted through a channel that is the transporter of the communication. The channel can be face-to-face or written communication which comes in many forms: one-to-one meetings, small groups of people, formal meetings or large groups, email, written memos, letters, websites, or reports. Message decoding assigns meaning and interpretation as the receiver to a message. Noise refers to factors that distort the clarity of the message to be encoded, transmitted, and decoded in the communication process. Noise can result in distortion or interference that contributes to misinterpretation of the intended meaning of a message. Cultural differences, language barriers, channel interference, attitudes, and physical distractions are examples of noise.

Once a message has been decoded, the process of communication continues when the receiver responds with a message to the sender (Hoy & Miskel, 2013; Cheney, 2011; Lunenburg, 2010).

Selection of the appropriate channel of communication should be determined by content of the message, the audience for whom it is intended, the leader's objective and one's strengths and weaknesses as a communicator. When these factors are taken into consideration the leader can make a more effective decision in selecting the best source for transmitting a message. Communication in organizations takes place in three major forms, written, verbal, and non-verbal (Ober, 2001).

Written communication

Organizations use a wide array of channels to transmit oral and written messages. Memos, letters, email, and websites are some of the most frequent means for written communication. Written communications must be accurate and allow no possibility of doubt. A written message often succeeds when an oral message fails. Written communication can also be costly when keeping records, time consuming, and lacks immediate feedback, clarification, and correction of written language. Success as the sender of a message depends highly on the sender's knowledge of the situation, the audience for whom the message is intended, and how well the knowledge is expressed in the communication process (Ober, 2001). Email is one of the most common methods of written communication in the workplace. Emails need to be sensitive in tone, aware of the audience, mindful of the different ways the message can be interpreted, and cognizant that the message might be read by individuals other than the receiver of the message. Clear understanding of these channels can help ensure the best medium is selected to deliver important messages.

Verbal/nonverbal communication

Sometimes written communication fails, and face-to-face, or oral communication accomplishes the goals for the organization. Face-to-face communication comes in many forms such as one-to-one meetings, small groups of people, formal meetings or large groups. Face-to-face meetings can be more effective to discuss sensitive issues. Krauss & Hadar (1999) posit that if we consider nonverbal communication channels such as gestures, body language, facial expressions, and cultural context, the challenge of effective communication becomes multiplied in terms of difficulty. The authors also concluded that gestures assist speakers to communicate and create messages.

When different types of gestures are identified, it can help to determine if their motions are increasing communication skills. Positive gestures that include smiling, touching, a firm hand shake, nodding of the head, leaning forward, and eye behavior communicate a sense of warmth, enthusiasm, and can essentially improve communication skills by helping one build a positive rapport with others (Hoy & Miskel, 2005). In contrast, one could convey frustration, anger or annoyance with gestures like the raised eyebrow, or tapping of fingernails, temperature in the room, and yawning with boredom. Through these nonverbal means they communicate fear, surprise, anger, and or disgust. Zoller (2009) argues that using appropriate gestures is one of the most important skills required for effective communication.

Use of technology

A number of changes have taken place in the process of communication mostly due to technology. The means in which employees communicate today compared to the manner in which employees communicated in the past decades have also changed. Technology plays a significant role in disseminating information to stakeholders through email, websites, videoconferencing, teleconferencing, blogs, and social media. Roy (2012) argues that effective leaders' ability to use innovative technology, video conferencing, instant messaging, and email are important technical skills to promote global leadership practices. Advancement in technology allows senders to receive immediate feedback to messages in the form of email, text, and voice messages. When

email or other technology-assisted messaging is used, good etiquette plays a key role to eliminate misinterpretation of information.

Employees must possess the knowledge, skills, and confidence to effectively incorporate technology into the workplace. Training programs can include a variety of technical skills to address the needs of employees, to include web-based training, use of mobile devices, computers, and laptops. These programs should be taught to enhance employees' abilities to use technology for learning purposes. Technology allows employers to deliver training anyplace at any time and respond to employees developmental needs. Online training can be effective for leaders and employee training. One of the issues related to technology-based training is lack of interaction with fellow employees. Technology should complement but not replace the human factors so crucial for effective communication.

Technology equipment should be in good working order and used properly. "Technical problems and solutions for technical support may also hinder the effectiveness of online" training (Barr & Miller, 2013). A technologist on staff to assist employees with technical difficulties and training on the use of technology can greatly enhance communication for the organization. Employees must to be able to defend or clarify all messages communicated within the organization. A breach in technology security can be a major threat to organizations and individuals. Antivirus protection, firewalls, and frequent changes in password can mitigate the risk of computers and devices being hacked.

Communication barriers

Barriers to organizational communication include cultural differences, socio-economic factors, language, emotions, and physical barriers. These barriers can create distortion to communication between the intended meaning of the sender and the interpreted meaning of the receiver. Messages can be misconstrued because of perceptual biases. Some information is sorted out as it moves up the hierarchy. The world is made up of diverse cultures. Cultural barriers occur due to differences in society, race, gender, and culture of the organization. Frequently, socioeconomic status, race, gender, religion, ethnicity, create cultural differences in society. Language barriers are likely to take place with an increase in immigrants, globalization, and different cultures. Colloquialism and inexplicit language are barriers when the sender and receiver have different interpretation of words and symbols transmitted in a message. Emotions barriers can cause fear, anger, mistrust, and reluctance. Physical barriers include walls, petitions, distance, physical disability, and hearing problems. These barriers can quickly bring the communication process in organizations to a standstill.

Conclusion

Effective communication must be carefully developed and ongoing to keep everyone informed of the status of change, practice, or events taking place within the organization. Communication plays a significant role in transmitting information to stakeholders. Technology is a useful tool to enhance employee skills and learning in the workplace. Technology has many tools available, but it is the responsibility of both the leader and employee to use them effectively. Leaders should use appropriate communication media when communicating with employees or to communicate work-related information throughout the organization. Miscommunication or lack of appropriate communication is more likely to have an effect on the people involved in the communication process and cause a negative influence on the organization's success and development. Awareness of common barriers to communication can reduce the effects of obstacles on effective communication in organizations. With the many changes and difficulties of organizations and the way communication occurs in organizations, it is crucial to evaluate communication practices to help mitigate factors that obstruct effective operations of organizations.

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The impact of age and online readiness on final grades in an open online course

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The purpose of this study was to examine the relationship between online readiness and age on final grades in an open online course. Utilizing Pearson correlation, researchers found that the relationships between age and final grade as well as overall online readiness score and final grade were weak and not significant. However, students view online learning as equivalent in quality with face-to-face learning. The study found that for online learning, prior experience, commitment to self-directed learning, and comfort level with meeting assignment deadlines were significantly correlated with final grades.

Keywords: Online readiness, age, online learning, academic achievement, persistence, open online course

Introduction

More Americans are taking online courses. One in four college students is taking at least one distance education course (National Center for Education Statistics, 2014a). In 2014, online enrollment at public four-year universities increased by 7.2% and online enrollment at private nonprofit four-year universities increased by 12.7% (Allen and Seaman, 2015). At the same time, less than 60% of students who began a bachelor's degree program in 2006 graduated within six years (National Center for Educational Statistics, 2014b). Unfortunately, many students who begin online courses do not complete those courses or perform well in those courses (Lee, Choi, and Kim, 2013; Levy, 2007; Park and Choi, 2007). In massive open online courses (MOOCs), the persistence outlook is even bleaker. Koller, Ng, Chuong, and Zhenghao (2013) found that only five percent of students who enrolled in a MOOC earned a certificate for completing a course. Thus, solutions are needed to improve academic achievement and persistence in online courses. Also, while academic persistence and academic achievement in online courses has been previously studied, more studies relating to open online courses are needed.

Literature review

Academic performance in Higher Education

Tinto (1993) argued that retention was related to the interactions between the institution and the student during a course of study, and explained student dropouts by examining the academic and social systems of an institution. He proposed that goal commitment results in higher grades, which in turn leads to greater institutional commitment to reduce dropouts. Bean and Metzner (1985) provided a retention model more applicable to nontraditional students as it included the role of external or environmental factors like work and family demands. The researchers noted that academic variables, the student's demographic profile, environmental, and psychological variables all affect persistence in nontraditional students.

Academic performance of non-traditional distance learners in online courses

Lee and Choi (2013) studied the effects of learning strategies, student satisfaction, flow experience, and academic locus of control (ALOC) on retention in online courses. The researchers found that ALOC and satisfaction each had significant direct effects on retention. Levy (2007) found that non-completers experienced significantly lower satisfaction in online courses than

completers. Cochran, Campbell, Baker, and Leeds (2014) found that the following factors were significantly related to retention in online classes: cumulative GPA, class standing, previous success or failure in online courses, academic loan status, and gender. However, the authors did not find a significant relationship between age and online course retention.

Online readiness and academic performance in online courses

According to Kirmizi (2015), self-directed learning, motivation, and learner control were strong predictors of academic achievement among students in distance education classes. However, online self-efficacy was not a significant predictor of academic achievement among students in distance education classes. Wang, Shannon, and Ross (2013) found a positive relationship between technology self-efficacy and academic performance in online courses. Lee, Choi, and Kim (2013) found a significant relationship among persistence in online courses academic locus of control and metacognitive self-regulation. Chang, Liu, Sung, Lin, Chen, and Cheng (2014) found that the relationship between Internet self-efficacy and online course performance was significant. Similarly, Yukselturk and Top (2013) found that self-efficacy for online technologies was a significant predictor of performance in online classes. However, DeTure (2004) found that self-efficacy for online technologies was not a strong predictor of performance in online courses. Ilgaz and Gulbahar (2015) found that access to technology was a critical component of online readiness.

Age and academic performance in online courses

Previous studies have analyzed the relationship between age and academic performance in online courses. When controled for cumulative GPA, age was not a significant predictor of academic performance (Jost, Rude-Parkins, and Githens, 2012). Lu, Yu, and Liu (2003) found no statistically significant relationship between age and performance in web-based courses. Kotey and Anderson (2006) found similar results in an online business course. However, Yukselturk and Top (2013) found age was a significant predictor of performance in online classes.

Purpose statement

The purpose of this study is to investigate the impact of age and online readiness on academic achievement in an Open Online Course (OOC) delivered to 173 registrants.

Research questions

To achieve the purpose of this research, we sought to answer the following questions through the study:

1. What is the relationship between age and online readiness score?
2. What is the relationship between age and final course grade?
3. What is the relationship between online readiness score and final course grade?
4. What is the relationship of age and online readiness score to final course grade?
5. What is the relationship between indicators of online readiness score to final course grade?

Theoretical framework

Park's (2007) theoretical framework for adult dropout in online learning was used as a framework for our study. Factors that influence a student's ability to persist and be successful in an online course include learner characteristics, learner skills, external factors, and internal factors (Park and Choi, 2007). Learner characteristics include age, employment status, gender, and education. Learner skills is a broadly defined category. In this study, online readiness was be considered a learner skill. External factors include family issues, managerial support, scheduling conflicts, and personal issues. Internal factors include academic integration, lack of motivation, technology/

technical/usability issues, and social integration. For this study, final course grades were used as a measure of persistence.

Method

Students who participated in an open online course on instructional technology for educators during the summer of 2013 provided survey responses at the beginning of the course (Baker and Gentry, 2014). The pre-course and post-course surveys included questions to assess online readiness based on McVay's (2000) Revised Student Readiness for Online Learning Questionnaire (Hall, 2011). Pearson Correlation was utilized to analyze the relationship between age and online readiness score, age and final course grade, and online readiness score and final course grade. Regression was utilized to analyze the relationship between age and online readiness score to final course grade. Regression was also utilized to analyze the relationship between indicators of online readiness score to final course grade. Survey results and final course grades were analyzed using SPSS. Age and final grade were ratio variables, and online readiness score was an ordinal variable.

Data collected included aggregate survey results (pre- and post-) from the Student Readiness for Online Learning (McVay, 2000), demographic data, and final course grades. Participants included students enrolled in the Open Online Course EDTC 538: Principles of Instructional Design & Technology, and were over the age of 18. Students who were not enrolled in the Open Online Course EDTC 538: Principles of Instructional Design & Technology were excluded from participation.

Results

As shown in Table 1, the relationship between age and grade was positive, weak, and not significant. The Pearson Correlation value was 0.098 with a p value of 0.330. The relationship between online readiness score and grade was also positive, weak, and not significant.
The Pearson Correlation value was 0.185 with a p value of 0.064. The mean grade was 89.3.
The mean online readiness score was 47.9. The mean age as 39.5.

Table 1
Correlations of age and online readiness score with grade.

Relationship	Pearson Correlation	Sig. (2-tailed)	N
Age and Grade	.098	.330	101
Online Readiness Score and Grade .	185	.064	101

As shown in Table 2, the correlation with grade was significant for questions five, six, eight, and eleven. Question five related to the view that online learning and classroom learning were of equal quality. Question six related to the view that the student's prior background and experiences would help him or her be successful in new learning experiences. Question eight related to self-directed learning. Question eleven related to time management for studying and completing coursework. The correlation with grade was not significant for all other questions related to online learning readiness.

Table 2
Correlation between online readiness questions and grade.

| | Grade | |
Online Readiness Question	Pearson Correlation	Sig. (1-tailed)
Q1	.030	.381
Q2	.145	.075
Q3	.072	.238
Q4	.032	.376
Q5	.231	.010
Q6	.171	.043
Q7	.096	.170
Q8	.271	.003
Q9	.158	.057
Q10	.142	.078
Q11	.195	.025
Q12	-.147	.072
Q13	.061	.272
Q14	.016	.436

Discussion

While the relationships between age and grade as well as overall online readiness score and grade were not significant, this information is still quite valuable. The relationship between age and grade supports the position that both old and young adults can be successful in online courses. The relationship between online readiness score and grade indicates that students with little online readiness can be successful in online courses, particularly if other supports are provided. In regard to specific components of online readiness, the following conditions were significantly correlated with grades: 1) student view online learning as equivalent in quality with face to face learning, 2) they expect that their prior experience will be relevant to their experience in online learning, 3) their comfort with self-directed learning, and 4) their comfort with planning study time as well as timely completion and submission of assignments. These conditions were similar to the aspects of online readiness studied by Kerr, Rynearson, and Kerr (2006), specifically independent learning, academic skills, intrinsic motivation, and locus of control.

The results are consistent with previous studies involving achievement or persistence and age, academic locus of control, self-directed learning, or technology self-efficacy (Cochran, Campbell, Baker, and Leeds, 2014; Lee and Choi, 2013; Kirmizi, 2015).

Limitations of the study

One limitation of the study is the sample size (N = 101). Another limitation of the study is that the sample included participants in one course. Also, only age and online readiness were considered in this study. Finally, online readiness and age may be less important in a course about online teaching and learning compared to a different content area.

Conclusions and future study

Future opportunities for research include comparing results of the first group of participants in the open online course to subsequent open online courses. In addition, the methodology could be applied to other online courses or open online courses. Future studies could also examine the relationship between final grades or persistence and other variables in addition to age and online readiness. Future studies could also examine the same variables in online courses in a different content area.

The results of this study have implications for distance learning program administrators and academic program leaders who offer online courses or programs. If the relationship between age and grade in online classes is not significant, prohibiting certain age groups from taking online courses might be an unnecessary barrier and limit access to courses students need to stay on track toward degree completion. In addition, if the relationship between online readiness score and grade is not significant, prohibiting students from taking online courses until they complete an online readiness course or prohibiting students from taking online courses if they indicate low readiness on an online readiness assessment might be an unnecessary barrier to course and degree completion. This is particularly true for students who would have difficulty consistently attending face-to-face classes. Since the course in this study focused on online teaching and learning, participants had opportunities to improve online readiness throughout the course. In other content areas, instructors and course designers could include resources to enhance online readiness within the online course to try to improve course outcomes.

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