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Abstract

There is sufficient evidence to support the importance of adaptive student engagement with respect to improved school behavior, academic achievement, and high school completion rates. Students who are more engaged exhibit high levels of adaptive attention, cognition, and behaviour as well as create social, physical, and intellectual resources (i.e., Appleton, Christenson, & Furlong, 2008; Fredrickson, 2001). A three-year study designed to investigate and track student engagement and academic achievement with Grade 9 and 10 students has demonstrated that 21st century instructional practices have the potential to improve students' perceptions of community, orientation to school, and in particular, their academic strategies.

Theories regarding student engagement have proliferated over the past 25 years when it was recognized that while high school enrollment can be mandated, it is impossible to legislate academic, behavioural, cognitive, and psychological involvement in school (e.g., Appleton, Christenson, & Furlong, 2008). The importance of this understanding is due to the fact that student engagement is the primary theoretical orientation when addressing high school completion (Christenson, Reschly, Appleton, Berman, Spanjers, & Varro, 2008). By attending to more adaptive student engagement levels, the risks associated with early school dropout may be mediated and in turn reduced. In the meantime, student engagement undergirds adaptive psychological, cognitive, behavioural, and academic success in school.

How to best improve student engagement is debatable. While many of the studies conducted thus far have focused upon academic and environmental factors within the school context, fewer have included personal variables (Fredericks, Blumenfeld, & Paris, 2004). However, as discussed by Reschly, Huebner, Appleton, and Antaramian (2008), positive psychological factors may be the most important as they lead to adaptive emotions for coping and resiliency. Specifically, students need to feel positive connections with their school and its members. The higher the level of psychological connection a student perceives, the greater the impact in regard to affective components and in turn, academic outcomes (e.g., Furrer & Skinner, 2003; Reschly, et al, 2008). Therefore, it appears that student engagement levels may be best elevated where there is a strong commitment to school community and elevated levels of communication. Given the importance of 21st century learning approaches in the personal and academic lives of contemporary youth, it is possible that students may become more engaged in school should instructional practices reflect these conditions. Hence, this article is based upon outcomes from a three-year study designed to improve student engagement using 21st century instructional approaches and practices (i.e., the usage of advanced communication technologies, more differentiated instruction, and greater frequency of assessment for learning).

Student Engagement

Despite the regularity of student engagement discussions within the literature, it is difficult to define given inconsistencies regarding its conceptual basis (Appleton et al, 2008). Depending upon

the researcher, engagement is regarded as either a positive or a negative outcome (i.e., involvement or disenchantment), or a construct predicated on contextual factors versus personal individual precursors. Regardless of these differences, there is a common understanding that there are a number of components making student engagement a multidimensional construct, albeit in varying degrees and aspects.

Most engagement researchers subscribe to a two or three component model that includes *behavioural* (i.e., student participation and effort), *affective* (i.e., attitude and interest), and/or *cognitive* subtypes (i.e., self-regulation and goal orientation). Recently, Reschly and Christenson (2006a, 2006b) proposed a four-subtype model comprised of *academic*, *behavioural*, *cognitive*, and *psychological* factors. According to their model, variables such as graduation credits, time on task, and homework completion constitute academic engagement. Behavioural engagement indicators include attendance statistics, voluntary classroom participation, suspension rates, and extracurricular participation. Less observable are cognitive and psychological engagement factors as they tend to be more internal. They can be demonstrated via evidence of self-regulation, perceived value of learning, personal goals, and autonomy. With respect to cognitive engagement, students' perceived sense of belonging and identification are noted. Finally, relationships with teachers and peers are additional examples of psychological engagement (Appleton, et al., 2008; p. 372).

While it is obvious that student involvement must include attendance, graduation credits, time on task, and homework completion, these academic and behavioural factors are insufficient if the student lacks a motivational commitment. That is, students must feel connected to the school environment and its inhabitants, and value what is being provided both academically and socially in order to be engaged (e.g., Christenson, Sinclair, Lehr, & Godber, 2001; Lehr, Hansen, Sinclair, & Christenson, 2003). This can be accomplished by building a strong sense of community and care (e.g., Christenson & Thurlow, 2004). Students who perceive that their teachers and peers are supportive of them will lead to a beneficial cycle of increased levels of engagement (e.g., Baumeister & Leary, 1995). Nevertheless, there are some stumbling blocks that can mitigate the effectiveness of positive school attempts to increase student engagement. They include gender, grade level, and socioeconomic status (SES).

Studies have shown that while girls experience not only a greater sense of belonging, peer support, relevance toward school work, and academic engagement (Marks, 2000; Reschly, et al, 2008), male students have a higher sense of relatedness toward teachers and higher levels of teacher-reported engagement (Furrer & Skinner, 2003; Reschly, et al, 2008).

With respect to grade level factors, the move from elementary school to middle school can be detrimental with marked declines in motivation, attitude, and attendance as well as increases in mental health issues, crime, and substance abuse This is especially evident between grades 7 to 9 (Reschly, et al, 2008; p. 421). Finally, socio-economic factors and minority status may have an impact on student engagement. As indicated above, these factors are correlated with students being at-risk for non-completion of school. That is, at-risk students typically have poor relationships with teachers, feelings of isolation, behavioral disorders, and achievement-related factors (e.g., Satchwell, 2004; Suh, & Suh, 2007; Suh, Suh, & Houston, 2007). As such, they are less likely to be positively engaged in school.

Rationale for this Study

As indicated earlier, this study was designed to improve student engagement by way of 21st century instructional approaches. They include communications technology learning methods, as well as differentiated instruction and assessment for learning strategies. Throughout the literature there is consensus that education is beginning to move away from traditional educational patterns to

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more innovative modes and methods of learning (e.g., Cheng, 2006; Trilling & Fadel, 2009). Rapid technological changes have increased the availability of information as well as radically improving communication. The traditional method of instructing students to locate and report knowledge under the direction of the teacher is no longer sufficient. Memorization, repetition, and basic comprehension are lower order skills that were once useful, but in the Knowledge Age, inadequate when compared to higher order skills such as critical and creative thinking, elaboration, and evaluation. In other words, students are now expected to be good problem solvers and *knowledge builders* (Bereiter & Scardamalia, 2006; Scardamalia & Bereiter, 2006). In addition, 21st century school-aged students are rapid processors of information who demand more expedient methods of instruction and communication (e.g., Kapitzke, 2006), both as independent, self-directed learners as well as being members in a larger community of learners. Teacher centred instruction has now given way to student centred classrooms.

As explained by Scardamalia and Bereiter (2006), knowledge building can be further defined as "a coherent effort to initiate students into a knowledge creating culture. Accordingly, it involves students not only developing knowledge-building competencies but also coming to see themselves and their work as part of the civilization-wide effort to advance knowledge frontiers" (pp. 97-98). To that end, 21st century learners must also understand the socio-cognitive aspects of knowledge building (Law, Lee, & Chow, 2002; Scardamalia & Bereiter, 2006; Zhang, Scardamalia, Reeve, & Messina, 2009). Students must understand that they are not working in isolation, but are part of a larger community of thinkers (Zhang, et al, 2009). They must learn to accept the ideas of others, receive constructive feedback, anticipate challenges and problems, engage in self-monitoring and reflection, and build upon the work of others (e.g., Bereiter & Scardamalia, 2006; Walser, 2008; Zhang, et al, 2009).

Therefore, this study will employ 21st century learning approaches (i.e., communication technologies, differentiated instruction, and assessment for learning) in the hopes of improving student engagement in a single school setting. Through such practices, students will be engaged academically, behaviourally, cognitively, and psychologically. Students in Grades 9 and 10, with particular emphasis on students identified as "at-risk", are the primary focus.

Method

Participants

This study was designed to span three years (i.e., 2008/2009, 2009/2010, and 2010/2011). At the time of baseline data collection, there were 466 participating students from Grades 9 (n=240) and 10 (n=226). Demographical breakdowns identified 221 males and 245 females; 25 self-identified Aboriginal students; 24 English as a Second Language Students; 14 emotionally and behaviourally challenged students; and 59 students with learning disabilities.

The rationale for selecting and tracking a target group of Grade 9 and 10, with a particular focus upon at-risk students, was so they could be tracked until the point of their anticipated graduation. By the 2009/2010 school year those numbers had dropped to 228 participating students in Grades 10 (n=126) and 11 (n=102). Demographical breakdowns identified included 112 males and 116 females; 9 self-identified Aboriginal students; 8 English as a Second Language students; 4 emotionally and behaviourally challenged students; and 26 students with learning disabilities. The 2010/2011 school year showed another drop to 184 participating students in Grades 11 (n = 93) and 12 (n = 91). Males comprised 90 of the students while there were 94 female participants; 8 self-identified Aboriginal students; 3 English as Second Language students; 3 emotionally and behaviourally challenged students; and 18 students with learning disabilities. Reasons for attrition included student movement and lack of continued participation by the students. That is, some

students opted not to participate in the data collection process. It is important to note that this school is located in a lower to middle class socio-economic environment.

Procedure

Prior to implementation, significant upgrading of technology hardware was scheduled so that all teachers and students were given a laptop, all classrooms were upgraded to multimedia standards (i.e., data projectors, Smart Boards, sound systems, and wireless keyboard/mouse), and wireless access points were established throughout the school. With respect to the professional development of the teachers, this began in 2008 and remained ongoing until completion of the study. Specifically, there is reporting and sharing from departmental teams at all staff meetings (key strategies for building sense of community, technology supports and differentiated assessment and instruction); assigned professional growth days focused on the project; an incorporation of the research project as the key theme at the school's annual staff retreat in September for three consecutive years; the assignment of a teacher as a project coordinator to plan, deliver and monitor professional growth; and an alignment of the district provincial project initiatives for education. Thus, 21st century instructional practices are discussed and shared on a daily basis within the school. All teachers were reminded to utilize advanced communication technologies, to incorporate differentiated instruction in all lesson and unit plans, and to employ assessment for learning as frequently as possible. These pedagogical approaches were regularly checked and enforced through learning teams and administrative support mechanisms.

The first data collection procedure occurred in the late fall of 2008/2009 so that baseline information could be gathered. This included administration of the Canadian Test of Basic Skills (1998) (i.e., Quantitive Thinking and Reading Comprehension subtests) to establish student achievement levels. Behaviour and attitudes toward learning were measured using two research-generated instruments regarding technology usage, differentiated instruction, and assessment for learning and their impact on learning behaviours. Student affect was measured using these same behavioural measures as well as an additional instrument that ascertains perceptions of school life and peer relations. These same instruments were re-administered in spring, 2009, along with data supporting retention rates. The third installment of this test battery was in spring, 2010, and was repeated for the final time in spring 2011.

Instruments

For measurement of student achievement, the Canadian Test of Basic Skills (1998) was selected. This is a norm-referenced achievement battery composed of tests in several subject areas. Only the Math (Test Q: Quantitative Thinking) and English/Language Arts (Test R: Reading) subtests were selected in order to ascertain basic academic skill changes throughout the study.

Behaviour and attitudes toward learning were measured using two researcher-generated instruments regarding technology usage and its impact on learning behaviours. The Contemporary Learning Survey is a 73-item instrument divided into four sections (i.e., Demographical Information, Integration of Software Tools, Pedagogical Approaches, and Communication Usages). Students are asked to rank their abilities using a 5-point scale (i.e., no ability, low ability, moderate ability, high ability, or expert ability) regarding specific technological tools such as spreadsheets, databases, blogs, laptops, and so forth. They are also asked to report whether instruction is more student centred, teacher centred, or a combination of both; whether learning is more critical thinking based or factual knowledge based; whether learning contexts are more artificial or authentic; and so forth.

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The Sense of Community Questionnaire is a 20-item instrument divided into three parts. The Academic Sense of Community section asks questions regarding the use of technology and its ability to provide the student with better methods of interacting with teachers and peers for academic improvement. The Social Sense of Community section determines how the student regards technology for social connectivity with peers and social relationships. And finally, the Global Sense of Community asks students about their connectivity to their community and the world. All questions were to be answered using a 5-point scale (i.e.,
Strongly Agree, Agree, Neither Agree or Disagree, Disagree, and Strongly Disagree).

Student affect was measured using these same behavioural measures as well as an additional instrument that ascertains student's perceptions of school life and peer relations (i.e., the Student Orientation to School Questionnaire) (Nadirova, Burger, & Mykula, 2008). It employs the same 5-point scale as the Sense of Community Questionnaire and asks questions regarding student interests, levels of motivation, and student engagement with academics, teachers, and peers.

Data Analysis Plan

To address the research questions, initial descriptive statistics were computed to explore frequencies, central tendencies, variability, and distributional qualities of the variable of interest. Following preliminary analysis, Friedman's Tests and Wilcoxon's Signed Ranks tests were employed to test the non-parametric outcomes of the surveys. This enabled a closer inspection of how the students' perceptions changed from the start of the study until its conclusion. Finally, General Linear Model Repeated Measures was used to test changes in the CTBS subtest scores. All analyses were conducted using version 19 of IBM SPSS Statistical package.

Results

Demographical Information

Descriptive frequency counts were calculated for participants. From 2008/2009 to 2010/2011 there was a substantial drop in participants (see Table 1). Student losses are primarily a consequence of student movement within and outside the school district, followed by a lack of participation in the project, and finally school dropout.

Repeated Measures

To determine changes in achievement scores from 2008/2009 until 2009/2010 and 2010/2011, data was analyzed using GLM Repeated Measures ANOVA. Means and standard deviations for combined Grades 9 and 10 CTBS subtests scores are reported in Table 2.

Table 1

Participant Demographics

	2008/2009 n	2009/2010 n	2010/2011 n
Grade 9*	240	126	93
Grade 10**	226	102	91
Male	221	112	90
Female	245	116	94
Aboriginal	25	9	8
ESL	24	8	3
Emotional/Behavioural	14	4	3
Learning Disabled	59	26	18

- This same body of Grade 9 students now became Grade 10 students in 2009/2010 and Grade 11 students in 2010/2011

** This same body of Grade 10 students now became Grade 11 students in 2009/2010 and Grade 12 students in 2010/2011.

Table 2

Means and Standard Deviations for CTBS Subtest Scores

Year	Quantitative Reasoning		Reading Comprehension	
	Mean	S.D.	Mean	S.D.
2008/2009	19.77	6.90	23.99	8.67
2009/2010	17.68	7.50	23.27	10.18
2010/2011	17.40	8.87	26.12	9.99

Results of the Repeated Measures ANOVA concerning the CTBS subtest scores showed a significant effect for Quantitative Reasoning F (2,210) = 15.77, $p < .00$, power = .99 and for Reading Comprehension F(2, 218) = 6.21, p < .00, power = .88 from 2008/2009 until 2010/2011.

For the purposes of analyzing meaningful univariate pairwise differences, pairwise comparison analyses for Quantitative Reasoning indicated that the mean for the 2008/2009 subtest was significantly higher than both the 2009/2010 and 2010/2011 means. In regards to the Reading Comprehension subtest, pairwise comparison analyses indicated the mean for the 2010/2011 subtest was significantly higher than both the 2008/2009 and 2009/2010 subtest means. Therefore, while Quantitative Reasoning remained stable between 2009/2010 and 2010/2011, it was significantly lower than the first administration. Conversely, the Reading Comprehension subtest score for 2010/2011 was significantly higher than the first two administrations, which were not significant from one another.

To determine the changes in those students at-risk, a variable was created designating students either as "not being at-risk" (n=91) or "at-risk" (n=20) (i.e., Aboriginal, ESL, Emotional/Behavioural, and Learning Disabled students as of 2010/2011). Results of the Factorial

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Repeated Measures ANOVA failed to show significant interactions between At-Risk students and the Quantitative Reasoning subtest scores as well as between At-Risk students and the Reading Comprehension subtest scores. As seen in Table 3, for both student groups, the mean scores for Quantitative Reasoning subtests dropped throughout each administration, but increased gradually in regards to Reading Comprehension subtest scores.

Table 3

Means for Quantitative Reasoning and Reading Comprehension Subtest Scores for "Not At-Risk" and "At-Risk" students

Student Groups	Quantitative Reasoning			Reading Comprehension		
	08/09	09/10	10/11	08/09	09/10	10/11
"Not At-Risk"	21.00	18.11	18.01	25.63	24.67	27.12
"At-Risk"	15.21	15.16	14.58	17.00	19.15	21.55

Friedman Tests and Wilcoxon Signed Ranks Tests

Friedman tests were used to determine changes from 2008/2009 to 2010/2011 on the Contemporary Learning Survey, the Sense of Community Questionnaire, and the Student Orientation to School Questionnaire.

The Contemporary Learning Survey. As previously discussed, this survey is comprised of four sections. Along with a total survey score, Sections 2 (Integration of Software Tools), 3 (Pedagogical Approaches), and 4 (Communication Usages) were totaled to create sub-scores. Table 4 is comprised of the descriptive data by year of administration and subtotals.

Table 4

Contemporary Learning Survey Descriptive Subtest Statistics

Descriptive	2008/2009			2009/2010			2010/2011		
	Sec 2*	Sec 3**	Sec 4***	Sec 2*	Sec 3**	Sec 4***	Sec 2*	Sec 3**	Sec 4***
Valid N	257	263	298	173	175	215	185	185	184
Mean	2.34	2.44	1.57	2.30	3.15	1.51	2.47	3.21	1.56
S.D.	.71	.47	.53	.67	.49	.54	.83	.66	.75

* Integration of Software Tools
** Pedagogical Approaches
***Communication Usages

Friedman tests were conducted on total scores for the Contemporary Learning Survey. The Friedman test is a nonparametric two-way analysis of repeated measures data. Results indicated significant differences on total survey scores across the three administrations (Friedman chi-squared = 10.47, df = 2, $p < .005$). Wilcoxon Signed-Rank tests were utilized to determine post-hoc differences. Results demonstrated that Contemporary Learning total scores were significantly improving from 2008/2009 (Mdn = 2.13) to 2009/2010 (Mdn = 2.29), Z = 3.69, $p < .00$; and

2009/2010 (Mdn = 2.29) to 2010/2011 (Mdn= 2.37), Z = 5.24, $p < .00$.

Friedman tests were also conducted on Contemporary Learning subtest scores. Results indicate that there was a significant change in "Integration of Software Tools" subtest scores (Friedman chi-squared = 7.25, df = 2, $p < .02$) and "Pedagogical Approaches" subtest scores (Friedman chi-squared = 52.55, df = 2, $p < .00$). No significant differences were found for the "Communication Usages" subtest scores.

Wilcoxon Signed-Rank tests were utilized to determine post-hoc differences for both sets of subtest scores. Results indicated that 2010/2011 (Mdn = 2.48) "Software Tools" subtest scores had significantly improved from the 2009/2011 (Mdn = 2.35) administration (Z = 2.62, $p < .00$). Moreover, the "Pedagogical Approaches" subtest scores had significantly improved from the 2008/2009 (Mdn = 2.50) until the 2009/2010 (Mdn = 3.13) administration (Z = 8.13, $p < .00$) as well as the 2008/2009 (Mdn = 2.50) until the 2010/2011(Mdn = 3.16) administration (Z = 7.89, $p < .00$).

Analyses were also conducted for students identified as "At-Risk". No significant changes were detected on the total survey score or the subtest scores.

Sense of Community Questionnaire. This instrument is comprised of three sections: Academic Sense of Community (Part 1), Social Sense of Community (Part 2), and Global Sense of Community (Part 3). Parts 1 and 2 each have eight questions regarding how technology has assisted them to be more academically and socially connected to their peers, teachers, and classroom activities, respectively. Part 3 has four questions regarding connections to the community and the world. Each part was calculated to create a subsection score. Table 5 embodies the descriptive data by year of administration and subtotals.

Table 5

Sense of Community Questionnaire Descriptive Statistics

Descriptive	2008/2009			2009/2010			2010/2011		
	A.*	S.S. **	G. ***	A.*	S.S.**	G.***	A.*	S.S.**	G.***
Valid N	373	368	379	281	273	279	149	144	234
Mean	2.31	2.83	2.38	2.33	2.84	2.42	2.25	2.78	2.42
S.D.	.68	.77	.82	.71	.77	.76	.68	.75	.76

* Academic Sense of Community
** Social Sense of Community
*** Global Sense of Community

Friedman tests were conducted on the Sense of Community Questionnaire Total Scores (2008/2009 Mean = 2.49; 2009/2010 Mean = 2.48 and 2010/2011 Mean = 2.52) and subtest scores. Results indicate that there were no significant changes.

Pearson Chi-Square Analyses were also conducted for students identified as "At-Risk" for Total Scores and subtest scores. No significant changes were detected.

Student Orientation to School Questionnaire (SOSQ). Friedman tests were also used to ascertain the presence of significant changes on the SOSQ. No significant changes were noted. Descriptive statistics for total scores are presented in Table 6 for "Not At-Risk" and "At-Risk"

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students.

Table 6

Student Orientation to School Questionnaire Descriptive Statistics for "Not At-Risk" and "At-Risk" Students

Student Groups	"Not At-Risk"			"At-Risk"		
	08/09	09/10	10/11	08/09	09/10	10/11
Valid N	149	129	136	37	25	26
Mean	2.26	2.47	2.26	2.25	2.35	2.18
S.D.	.52	.77	.54	.67	.49	.57

Discussion

In 2008/2009, the school in which this study takes place underwent a full upgrading of technological hardware as well as extensive professional development to better understand and implement 21st century learning practices and strategies. That spring (2009), students were asked to complete the Contemporary Learning Survey, the Student Orientation to School Questionnaire, and the Sense of Community Questionnaire. They also completed two subtests of the Canadian Test of Basic Skills (i.e., Reading Comprehension and Quantitative Reasoning). The following years (i.e., 2009/2010 and 2010/2011) involved continued professional development and implementation of technology as well as the re-administration of the four identified instruments. Although not as significant as been hoped, results suggest that there were changes in student perceptions and achievement.

With respect to student achievement, reading comprehension scores demonstrated significant growth by 2010/2011. There were no significant changes, however, for students "At-Risk". Surprisingly, the quantitative subtest scores significantly dropped from 2008/2009 baseline results for the Grade 9 and 10 cohort, but there were no significant changes for those student identified as being at-risk. Why the quantitative subtest scores did not show improvement from the baseline measure is difficult to speculate. Nevertheless, they did remain stable from 2009/2010 until 2010/2011. While improvement in the Reading Comprehension scores was a positive outcome, there is no evidence to suggest that the significant change was due to this study. Therefore, extreme caution must be exercised when interpreting and accrediting causation.

Results of the Contemporary Learning Survey indicated the most promising outcomes of this study. When analyzing the total survey score, there was significant improvement on each successive administration. That is, each year demonstrated significant positive change in regards to the perceptions and usage of 21st century learning strategies and practices. Specifically, post hoc analyses demonstrated that "Integration of Software Tools" and "Pedagogical Approaches" subtests were the most significantly improved. These are promising results as they indicate that students were being progressively introduced to, and familiarized with more advanced information technologies. In addition, the students perceived that teachers were using more student centred (i.e., multisensory, critical thinking, inquiry-based) instructional strategies and approaches as compared to traditional, teacher-centred approaches.

Unfortunately, although still positive, sense of community and school orientation did not significantly improve for the students. While academic status, instruction, and strategy usage were showing significant gains, the engagement with the school community remained stable. Students

typically reported positive responses (i.e., "Agree" to "Neither Agree to Disagree", numbers 2 and 3, respectively) as per the means for each subtest and survey total scores in 2008/2009, and those means remained stable. Therefore, while there was never a negative trend regarding sense of community (i.e., academic, social, and global) and school orientations, there failed to be a significant shift toward "Strongly Agree" (number 1).

Despite not having large numbers of positive significant changes at the conclusion of this study, there is evidence that 21st century learning strategies and approaches are being embraced. Specifically, there is a perceived pedagogical shift from teacher centred instruction and methods toward greater technological usage, differentiated instruction, and assessment for learning practices. Unfortunately, there is no significant evidence that students' sense of community or orientation is becoming even more positive, but such changes may require additional time or a more overt focus. It is important to note that there was a large teacher turnover in 2009/2010 due to the opening of another secondary school within a 20 kilometer radius, which also explains the drop in student participants as many enrolled in the new location. Nevertheless, evidence of student engagement with respect to academic success and strategy usage is significantly improving from baseline. Moreover, the positive perception of sense of community and orientation is remaining stable. While outside the scope of this article, there was additional evidence to suggest that teachers themselves were demonstrating a greater awareness and usage of 21st century strategies and pedagogies. Over the course of three years, there was significant growth in regards to software usage, differentiated instruction and assessment practices, communication purposes, student centred instructional methods, and levels of technological usage. This level of teacher participation was likely the strongest reason for student recognition and adoption of 21st century practices. A published manuscript of these findings is forthcoming.

In conclusion, while there is evidence to suggest a significant trend toward greater 21st century learning skill acquisition and implementation in a single school context, there is still only conservative evidence supporting project-based influence regarding student engagement at that same school.

References

Appleton, J. J., Christenson, S. L., & Furlong, M. J. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools, 45*, 369-386.

Appleton, J. J., Christenson, S. L., Kim, D., & Reschly, A. L. (2006). Measuring cognitive and psychological engagement: Validation of the Student Engagement Instrument. *Journal of School Psychology, 44*, 427-445.

Baumeister, R.F. & Leary, M.R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117,* 497-529.

Bereiter, C., & Scardamalia, M. (2006). Education for the knowledge age: Design-centered model of teaching and instruction. In P. A. Alexander, & P. H. Winne (Eds.), *Handbook of Educational Psychology* (2nd edition) (pp. 695-713). Mahwah, NJ: Lawrence Erlbaum Associates.

Canadian Test of Basic Skills. (1998). Scarborough, ON: Nelson Education Ltd.

Cheng, Y. C. (2006). New paradigm of learning and teaching in a networked environment: Implications for ICT Literacy. In L. T. W. Hin, & R. Subramaniam (Eds.), *Handbook of Research on Literacy in Technology at the K-12 Level* (pp.1-20). London: Idea Group Reference.

https://pdxscholar.library.pdx.edu/nwjte/vol10/iss1/1
DOI: 10.15760/nwjte.2012.10.1.1

Christenson, S. L., Reschly, A. L., Appleton, J.J., Berman, S., Spanjers, D., & Varro, P. (2008). Best practices in fostering student engagement. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology* (5th ed., pp. 1099-1120). Bethesda, MD: National Association of School Psychologists.

Christenson, S. L., Sinclair, M. F., Lehr, C.A., & Godber, Y. (2001). Promoting successful school completion: Critical conceptual and methodological guidelines. *School Psychology Quarterly, 16*, 468-484.

Christenson, S. L., & Thurlow, M. L. (2004). School dropouts: Prevention considerations, interventions, and challenges. *Current Directions in Psychological Science, 13*, 36-39.

Fredericks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 74*, 59-109.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologists, 58*, 218-226.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95*, 148-162.

Kapitzke, C. (2006). Internet chatrooms: E-space for youth of the risk society. In L. T. W. Hin, & R. Subramaniam (Eds.), *Handbook of Research on Literacy in Technology at the K-12 Level* (pp.158-175). London: Idea Group Reference.

Law, N., Lee, Y., & Chow, A. (2002). Practice characteristics that lead to 21st century learning outcomes. *Journal of Computer Assisted Learning, 18*, 415-426.

Lehr, C.A., Hansen, A., Sinclair, M. F., & Christenson, S.L. (2003). Moving beyond dropout towards school completion: An integrative review of data-based interventions. *School Psychology Review, 32*, 342-364.

Marks, H.M. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Educational Research Journal, 37*, 153-184.

Nadirova, A., Burger, J., & Mykula, C. (2008). Improving high school completion: Predictive qualities of the Student Orientation to School Instrument. Paper presented at the American Educational Research Association (AERA) Annual Meeting. New York, 2008.

Reschly, A., & Christenson, S.L. (2006a). Promoting school completion. In G. Bear & K. Minke (Eds.), *Children's needs III: Understanding and addressing the developmental needs of children* (pp. 103-113). Bethesda, MD: National Association of School Psychologists.

Reschly, A., & Christenson, S.L. (2006b). Prediction of dropout among students with mild disabilities: A case for the inclusion of student engagement variables. *Remedial and Special Education, 27*, 276.292.

Reschly, A. L., Huebner, E. S., Appleton, J. J., & Antaramian, S. (2008). Engagement as flourishing: The contribution of positive emotions and coping to adolescents' engagement at school and with learning. *Psychology in the Schools, 45*, 2008.

Satchwell, K. (2004). *Literature review for the high school completion rate project*. Alberta Education.

Scardamalia, M. & Bereiter, (2006). Knowledge building: Theory, pedagogy, and technology. In K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences* (pp. 97-118). New York: Cambridge University Press.

Suh, S., & Suh, J. (2007). Risk factors and levels of risk for high school dropouts. *Professional School Counseling, 10*(3), 297-306.

Suh, S., Suh, J., & Houston, I. (2007). Predictors of categorical at-risk high school dropouts. *Journal of Counseling & Development, 85*(2), 196-203.

Trilling, B. & Fadel, C. (2009). *21st century skills: Learning for life in our times*. San Francisco, CA: Jossey-Bass.

Walser, N. (2008). Teaching 21st century skills. *Harvard Education Letter, 24*(5), 1-3.

Zhang, J., Scardamalia, M., Lamon, M., Messina, R., & Reeve, R. (2007). Socio-cognitive dynamics of knowledge-building in the work of 9- and 10-year-olds. *Educational Technology Research Development, 55*, 117-145.

https://pdxscholar.library.pdx.edu/nwjte/vol10/iss1/1
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