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Is there still a place for teacher-led learning routines in the Australian primary school classroom?

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Abstract

There is a commonly held perception that when students are motivated toward learning, finding it engaging and relevant, they experience academic success. This message, echoed loudly in Australian society, anywhere from researchers to social commentators; reflects a call for Australian educators to make content and learning experiences sufficiently appealing to students, thus providing the greatest opportunity for academic success. As a result, a trend toward student-centred learning routines, where learning is designed in accordance with what students deem interesting and relevant, is becoming increasingly popular in Australian primary school classrooms (6-12 year old students). This task can be confusing and daunting for teachers. In our current fast-paced, technology driven world, how does one make lessons about prepositions, the Cartesian plane or vowel alternations interesting enough to incite motivation and enthusiasm for learning? Or, could it be that academic achievement and student motivation is less influenced by an individual's personal interest in a learning task or domain, and more about what the teacher does to establish learning routines that enhance these factors for students?

Findings of this study propose that the way teachers establish effective learning routines has more influence on student motivation and academic achievement than the extent to which students might initially consider content engaging or relevant. The findings contribute toward the existing body of knowledge relating to teacher-led learning routines, academic achievement and student motivation in the Australian primary school context. While findings do not mandate an either/or position when considering teacher-led or student-centred instruction, educators are urged not to neglect teacher-led learning routines in the Australian primary school classroom. As such, pre-service teacher education and training should reflect accordingly.

Introduction

This study investigates the relationship between learning routines, student motivation and academic achievement in the primary years of an independent South Australian school. Current research yields contrasting views on the relationship between learning routines, student motivation and academic achievement and the manner in which these variables interact with one another. In other words, which variables influence the others, if at all?

The work of Gardner and Jones (2016) emphasizes the importance of student-centred learning routines, stating that minimally guided instruction allows students to interact with content deemed engaging and relevant, thus enhancing motivation and academic achievement. By contrast, Kirschner, Sweller and Clark's (2006) Cognitive Load Theory rejects the effectiveness of minimally guided learning routines, claiming they ignore the structure of human cognitive architecture. Instead, Kirschner, et al. (2006) encourage educators to employ teacher-led routines with a focus on direct instruction, as these enhance academic achievement, and subsequent student motivation. When researching the effect of contextual factors on student motivation throughout an inquiry process, Adler et al. (2018) found the teacher's role in providing students with comprehensive guidance (information, cues, examples, feedback and prompts) was essential for students to make informed decisions about their learning. In other words, learning routines, with clear teacher guidance and scaffolding, enhance student motivation and subsequent academic achievement.

As conflicting emphasis is placed on the way that these variables interact with one another, the current study explored a variety of general learning routines that primary teachers were exercising at the time of the study (see examples in Figure 1) and their influence on student motivation and academic achievement in an Australian primary years classroom.

	Student-Centred Learning Routines:	Teacher-Led Learning Routines:
1	Students are encouraged to make personal choices about where they sit and how/when they participate in learning times.	Teacher decides where students sit and sets expectations for how students should participate in learning times.
2	Students choose learning tasks from a variety of options, based on appeal and personal interest.	Teacher differentiates learning tasks according to student needs.
3	Curriculum is planned in accordance with national requirements, guided by student interest.	Curriculum is planned in accordance with national requirements, guided by student needs.
4	Students construct their own meaning and learning from investigations and/or exploratory play, allowing the learning outcomes to be determined by experiences.	Teacher explicitly teaches content, based on predetermined learning outcomes, and students consolidate understanding with teacher-led learning tasks.
5	Teacher views themselves as co-learner and mentor.	Teacher views themselves as instructor and leader.

Figure 1. Learning routines.

The study is significant because it aims to evaluate pedagogical practice, in the specified context, in order to provide recommendations to theory, practice and policy for future strategic direction.

This article is structured as follows: the next section explores the current body of research on the relationship between student motivation, learning routines and academic achievement. This includes a summary of the research on learning routines promoting *personalization, participation, independence, investigation* and *differentiation*. Justification of the conceptual framework and research methods are then discussed, with findings stated. The article concludes with a discussion of key findings, and recommendations, together with study limitations and avenues for future research.

Definition of terms

Learning routines: Patterns established to organise and manage student learning (Visible Thinking, 2008).

Teacher-led routines: Teacher-led and directed patterns for organising and managing student learning (Dietz, Hofer & Fries, 2007; Elkind, 2018). See Figure 1 for examples.

Student-centred routines: Student-centred and student-directed patterns for organising and managing student learning (Dietz et al., 2007; Elkind, 2018). See Figure 1 for examples.

Academic achievement: Domain specific scores given to students to reflect academic ability and progress. This study utilises Progressive Achievement Test (PAT) scores in reading, spelling and mathematics.

Student motivation: Intrinsic and extrinsic factors that inspire and motivate students toward learning (Reeve, 2012; Areepattamannil, Freeman & Klinger, 2011).

Primary years: Students aged between 6-12 years of age. The Australian primary school context is structured in such a way that students have a generalist 'classroom' teacher for all Literacy, Numeracy, Humanities and Science and Technology learning areas.

Literature review

Student motivation and academic achievement

Tseng and Walsh (2016) observe that students who hold the belief that a learning task is interesting and important, will engage in a higher level of metacognitive activity, resulting in enhanced levels of academic achievement. Similarly, Gardner and Jones (2016) suggest that when teachers provide students with choice, and allow learning to be driven by student interest, motivation for learning is enhanced. Fisher et al.'s (2015) research supports the relationship between student motivation and achievement, claiming that students who are engaged and attentive toward their learning experience high levels of success.

By contrast, Dishon-Berkovits' (2014) research on the connection between goal setting, student motivation and academic achievement reveal that student motivation waned quickly when designed around performance-based goals (eg. achieve top marks for narrative writing),

however, teachers who assigned their students learning-based goals (eg. use commas, exclamation marks and direct speech marks correctly in narrative writing) noted an increase in academic performance. This is likely due to the situationally determined nature of motivation and indicates that academic achievement requires more than a student's innate or pre-existing disposition toward learning, but rather, can be induced by teacher practices. Adler et al.'s (2018) research emphasizes that student motivation and academic achievement is influenced by the extent to which teachers provide students with clear guidance and extensive scaffolding, based on research-driven education interventions.

Learning routines and academic achievement

Personalization

Personalized learning emphasizes the individual learner in favour of broad instruction to mass students (Miliband, 2013). Models, such as blended delivery, allow students to tailor their accessibility and engagement of content to suit their learning. Tseng and Walsh's (2016) research into the effectiveness of highly personalized instruction, claimed that, in addition to increased motivation, students engaging in a blended learning course, generally "scored higher on their final grades than students in the traditional course" (p. 48).

However, Prain et al.'s (2013) research highlights a caution to personalized instruction, suggesting that in contexts where teachers are committed to providing students with personalized learning experiences, students are at risk of becoming confused about the degree of choice being offered to them and, in this uncertainty, appear unable to make the most appropriate decisions about their learning. Therefore, while personalized learning may have the potential to influence academic achievement, success must be built around teacher expertise, experience and mutual responsibility for learning between teachers and students (Dishon-Berkovits, 2014).

A study undertaken by Song (2012) with primary aged students in Cambodia sought to establish the factors causing some students to remain in school until Grade 6 (end of primary school) while up to 40% of pupils dropped out before the end of the primary years. It was found that students who undertook study from teachers with vast experience, and were exposed to clear guidance and explicit teacher-led instructional time, were more likely to experience academic success and remain in school until at least the end of the primary years. These findings echo Prain et al.,'s (2013) research, claiming that teacher experience, teacher guidance and explicit instructional time are all correlated to student achievement. Of Song's (2012) three findings, it was established that teacher experience had the highest magnitude of effect on academic achievement. Song (2012) and Dishon-Berkovits' (2014) findings both emphasize the role of teacher expertise and experience in student academic achievement.

Participation

Participation refers to a student's active involvement in the learning process. Learning routines which promote student participation include pair/group work and collaborative learning. Kovacs, Johnson and Dixon's (2017) study required 89 students, enrolled in the 'Principles of Agricultural Macroeconomics' course at the University of Arkansas, to complete all in-class learning tasks in groups over the duration of one semester. A review of findings, related to the relationship between group work and academic achievement, indicated that group participation enhanced homework performance, but not exam performance (Kovacs et al., 2017). This may reflect the reality that homework can be completed in collaboration, but exams or tests cannot. Findings also indicate that positive collaboration and group engagement had minimal influence on individual task performance (Kovacs et al., 2017) .

Stoian's (2016) project level research suggests that collaborative learning can positively influence academic achievement, when the teacher explicitly assigns and concludes learning outcomes. This means that in addition to assigning a learning task, the teacher must ensure that students are provided with time at the conclusion of the learning to reflect on, summarize and evaluate the effectiveness of their learning in light of the pre-determined learning outcomes. Similarly, Brophy (1986) claims that academic achievement is enhanced when teachers expect students to master curriculum content through direct instruction. Rosenshine's (2012) extensive research in cognitive science and the classroom practices of master teachers, concluded that when teachers begin a lesson with a short review of previous learning, explicitly present new material in small steps; with student practice after each step; and expect students to engage in regular review of their learning, academic achievement is conducive to improvement. Interestingly, Rosenshire's (2012) findings state that many teachers also explored student-centred, experiential learning tasks with their students, but chose to do so only *after* the initial content was mastered. This decision was made by teachers with the acknowledgement that student-centred exploration of concepts and content was only effective when students had already acquired an appropriate and sufficient base of knowledge (Rosenshine, 2012).

Independence

Independence refers to a student's personal autonomy in the learning process. When researching independence in reading comprehension, Baumann and Ballard's (1987) findings, when exploring models for increased independence in reading instruction with secondary students, point toward the effectiveness of a *two step model*. This is where students are explicitly taught content, before engaging in guided practice, with the goal being that students move toward mastery of content and subsequent independence in learning. This same idea is sometimes known to educators as *I do, you do, we do* where research on the effect size of various teaching strategies identifies explicit teaching as the most influential on academic achievement (see Marzano,

2009, as cited in Killian, 2018). These findings may suggest that academic achievement requires an emphasis on teacher-led learning routines, rather than student-centred, choice-driven routines.

Similarly, Kirschner et al. (2006) suggests that, despite its potential appeal in the 21st century educational context, minimally guided instruction fundamentally ignores the structure of human cognitive architecture, and is therefore far less effective than instruction which places strong emphasis on teacher-led guidance. As Kirschner et al.'s (2006) stance is founded on Cognitive Load Theory, which assumes learning takes place when a change has occurred from short term memory to long term memory; the findings warn against educators viewing the learning process as students constructing or discovering information for themselves. Rather the teacher is viewed as an instructor (guiding and leading), explicitly teaching learners how to cognitively manipulate information from short to long term memory, based on learning goals.

Roblyer (1996) and Perkins (1991) examined extensive evidence for minimally guided instructional strategies. The findings of both researchers agree with Kirschner et al.'s (2006) suggestions that strong guidance is essential for effective learning and transfer. These findings indicate that teacher-led learning routines are more likely to be predictors of academic achievement. Therefore, it may be suggested that students who engage in explicit, guided instruction, experience higher degrees of academic achievement.

Investigation

Investigation refers to a student's involvement in exploring and experimenting with learning concepts. Linder, Powers-Costello and Stegelin's (2011) research into the effectiveness of exploratory play in mathematics in primary school classrooms, resulted in the belief that students who willingly and enthusiastically engage with numbers in early years of schooling are better equipped for academic success in future academic experiences (eg. secondary education and beyond). Similarly, when exploring the use of Problem-Based Learning (PBL) Trinter, Moon and Brighton's (2015) study, suggests that when mathematical content is presented to students in ways that are both appropriately engaging and challenging, educators will see their students' understanding and potential. These findings suggest that investigative learning has the potential to influence student motivation and subsequent academic achievement.

Logar et al.'s (2018) research on the effectiveness of investigative learning routines, with Slovenian primary years students, acknowledges its potential to enhance student motivation, but warns that its relationship to academic achievement is dependent on the extent to which educators plan with rigorous learning objectives in mind. Perhaps concerningly, findings explained that only half of educators planned in this way, compromising the effectiveness of investigative learning on academic achievement. It can be suggested that despite the potential for investigative learning to increase student motivation, this alone; in the absence of teacher instruction; may not be not enough to support academic achievement (Logar et al., 2018). These findings echo Dishon-Berkovits (2014) and Adler et al.'s (2018) acknowledgement of the fundamental role of the teacher in intentionally leading the learning, with clear objectives and a strong basis of content knowledge.

Differentiation

Differentiation refers to educators teaching students within their zone of proximal development (Vygotsky, 1978; Tomlinson, 2010; Kapusnick & Hauslein, 2001; McAllister & Plourde, 2008). Instead of whole group instruction, differentiated instruction designs the content, process and product of learning (Tomlinson, 2010) based on the individual needs of students.

Studies, when analysing the influence of differentiated instruction on reading comprehension in primary school classrooms, indicate that "differentiated instruction resulted in higher reading fluency and comprehension" (Reis et al., 2011, p. 492). Other significant findings include the observation that students experienced increased engagement and enjoyment of reading (Reis et al., 2011).

Stoian's (2016) findings suggest that for differentiation to be a predictor of academic achievement, the teacher must lead the learning, but students must also have the opportunity to collaborate, as this increases student motivation for learning. Morgan's (2013) case study of a disengaged eighth grade student discussed how differentiation should be used to maximize student success, suggesting that its effectiveness relies on hard working, knowledgeable and well-prepared teachers, the appropriate use of technology; to suitably engage students; and, teacher knowledge of their students' personal interests and unique learning needs.

Learning routines and student motivation

There is a belief that student motivation and academic achievement is increased when learning routines allow students to feel a personal and emotional connection to their learning goals and environment (Gardner & Jones, 2016; Jones, 2009). Learning routines inspired by this belief tend to emphasize minimally guided learning routines as they allow students to interact with content they deem engaging and relevant. Similarly, Slavin's (1983) research with elementary and secondary students found that, among cooperative learning methods (where students study the same material together) "only methods that provide group rewards based on group members' individual learning consistently increase student achievement more than control methods" (p. 429). While Tseng and Walsh (2016) claim that the relationship between learning routines and student motivation relies heavily on the presence of intrinsic motivation. This finding suggests that students need to consider learning tasks relevant and engaging in order to experience academic achievement .

Linnenbrink and Pintrich's (2002) research on what they consider to be the four key components of student motivation (academic self-efficacy, attributions, intrinsic motivation,

and achievement goals) suggest that the concept of student motivation should be viewed as multifaceted. Their research claims that a student's motivation for learning reflects the manner in which they interact and contribute to the learning environment. As this can change depending on the environment, caution should be exercised when labelling students as 'motivated' or 'unmotivated' so as not to be overly presumptuous.

Research questions

The research undertaken sought to explore teacher-led and student-centred learning routines for the purpose of discussing their relationship to student motivation and/or academic achievement. The study was undertaken in a primary years South Australian context. 285 primary aged students (between the ages of 6-12 years) and 15 teachers contributed to the data set.

The following objectives were addressed:

- The links between learning routines, student motivation and academic achievement.
- Strategies employed by teachers to establish learning routines with the intent of increasing student motivation and academic achievement.

[1]Hence, the study was guided by the following research questions:

RQ1) What is the link between learning routines and academic achievement (reading, writing, spelling), in primary years?

RQ2) How do teachers establish learning routines that may lead to student motivation or academic achievement, in primary years?

Conceptual framework

The conceptual framework (Figure 2) of this study outlines the potential relationship between learning routines, student motivation and student academic achievement. The framework reflects learning routines which promote *personalization, participation, independence, investigation* and *differentiation*.

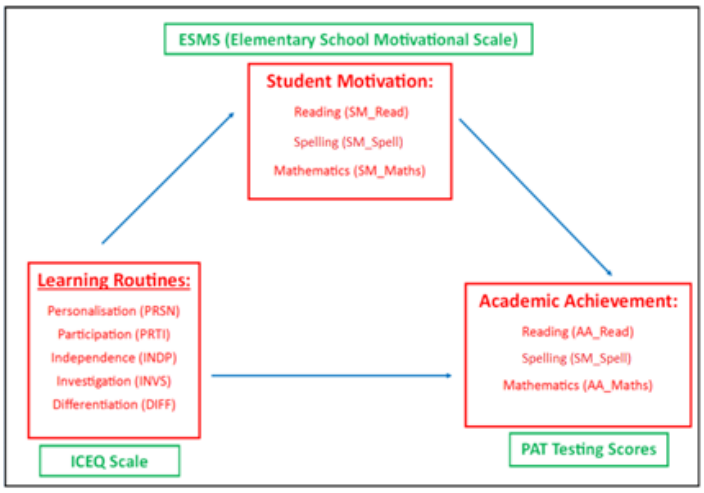

Figure 2. Conceptual framework.

Research methodology

Research design

The study employed a mixed methodology, particularly the embedded type. Mixed methodology is most effective when the research requires the use of quantitative and qualitative methods and that the use of both methods has complementary strengths rather than overlapping weaknesses (Creswell, 2006). More specifically, an Embedded Mixed Methods Design allows a secondary data set to inform a study based primarily on the other data type (Creswell & Plano Clark, 2006). This means that in the Embedded Design process, qualitative and quantitative data is not weighted equally. As two of the three questions posed in the original study required the collection of quantitative data, it was justified that the current study was largely quantitative, therefore more suitable to the Embedded Mixed Methods Design.

In the study undertaken, the disadvantages of the Embedded Mixed Methods design were minimised by ensuring that logical, purposeful and thoughtful planning allowed one data type to supplement the findings of the other (Creswell, 2006). As the study was primarily quantitative, qualitative data was obtained and used to further inform the findings of the study. As the data pertaining to student motivation and academic achievement is quantitative, only these findings are explored in this paper.

Survey instruments

The *Elementary School Motivational Scale* (ESMS) (Guay, Marsh & Dowson, 2005) was used to measure levels of motivation in students, making it suitable to address Question A. The scale, designed for primary years students, measures intrinsic and extrinsic motivation for learning in reading, spelling and mathematics. Each item in the ESMS was presented to students with a Likert-style response format; and in the data file, "Strongly Disagree" was coded as 1, "Disagree" as 2, "Uncertain" as 3, "Agree" as 4, and "Strongly Agree" as 5. ESMS items were analysed in the

[1] As this paper aims to discuss findings related to the relationship between learning routines, student motivation and academic achievement, only the questions 1 and 2 will be addressed. Question 3, while relevant to the context of the original study, explores methods used to sustain motivation and is not the focus of findings discussed in this paper.

RQ3) How do teachers establish learning routines that may sustain student motivation, in Primary Years?

domains of reading, spelling and mathematics.

The *Individualised Classroom Environment Questionnaire* (ICEQ) (Fraser, 1990) was used to measure the learning routines established by teachers in primary years classrooms, and was suitable to address Question B, due to majority of its development being within the Australian context. Items in the scale pertained to a variety of teacher-led and student-centred learning routines, aligned to the categories of *personalization, participation, independence, investigation* and *differentiation*, where teacher responses reflect what occurs in their classroom (ICEQ_Actual), as well as what they would like to see occur in their classroom (ICEQ_Preferred). Like the ESMS, each item was presented to teachers with a Likert-style response format; and in the data file, "Strongly Disagree" was coded as 1, "Disagree" as 2, "Uncertain" as 3, "Agree" as 4, and "Strongly Agree" as 5.

Academic achievement was measured using the school-wide *Progressive Achievement Test* (PAT) results.

Validation of survey instruments

To ensure drawing sound and meaningful interpretations of the analysis results of the collected data, it was necessary to establish the reliability of the measurement properties of the ESMS. The Rasch *Rating Scale Model* (RSM) was used to examine the measurement properties of the ESMS. Particularly, the Infit Mean Square (INFIT MNSQ) – i.e., the amount of "distortion" of the measurement system, or the size of the randomness of measurement (Linacre, 2002) – was examined. According to Linacre (2002), an INFIT MNSQ value of 1.0 indicate little distortion of the measurement system; values less than 1.0 indicate observation tend to being too predictable, and over 1.0 tend towards being unpredictable. In the study, a range between 0.60 to 1.4 (Jafari, et al., 2012) was used. This was considered appropriate as the ESMS is not a high stakes test requiring a much narrower range of INFIT MNSQ. Besides, Linacre (2002) has pointed out that INFIT MNSQ values between 0.5 and 1.5 are productive for measurement. All items in the ESMS were found to have INFIT MNSQ to fall within 0.6 and 1.4, thus, they were considered to function well and accordance with the assumptions of the Item-Response Theory (IRT) in establishing an item's measurement property.

The ICEQ (actual) and the ICEQ (preferred) were examined separately using the RSM. In addition, the ICEQ has been validated over several stages to establish its psychometric properties. Fraser's (1980) original validation metrics obtained an alpha coefficient ranging from 0.63 to 0.85 (personalisation = 0.78, participation = 0.67, independence = 0.83, investigation = 0.75 and differentiation = 0.78), suggesting satisfactory reliability. Ben's (2020) revalidation of the ICEQ supported earlier validation findings by Fraser (1980), observing that both the actual and preferred classroom ICEQ have "very high separation reliability", indicating "high discriminating power and small measurement error, demonstrating measurement precision and reliability" (Ben, 2020, p. 89). For in depth details of the re-examination of the utility of ICEQ Scales, see Ben's (2020) work.

Data collection

This study used school-based data. Data were collected through survey questionnaires measuring the following constructs: *Student motivation in reading, student motivation in spelling and student motivation in mathematics*, along with the use of teacher-led and/or student-centred learning routines promoting *personalization, participation, independence, investigation* and *differentiation*. PAT test data was used in conjunction with the ESMS and ICEQ scales to address the research questions. PAT reading, spelling and mathematics data was used in order to maintain consistency with the ESMS.

The participants of this study are 15 teachers and 285 primary aged students. Teachers are aged between 22-59 years with experience ranging between 2-32 years. Teachers participating in this study are all generalist 'classroom' teachers, responsible for Literacy, Numeracy, Humanities, Science and Technology subjects at their relevant year level, as is typical in the Australian primary school context. Student participants ranged between the year levels of Foundation (5-6 year olds) through to Grade 6 (11-12 year olds). The convenience sample method was employed as subjects were readily accessible to the researcher, met the practical criteria and were willing to participate in the study (Etikan, 2016). Data was collected in the first semester of 2018.

Data analysis

Analysis of ICEQ (Fraser, 1990) and ESMS (Guay, Marsh & Dowson, 2005) scales employed specialised statistical analysis computer software, including Statistical Package for the Social Sciences (SPSS) and ConQuest 2.0 (Wu, Adams, Wilson & Haldane, 2007) to inform descriptive and inferential analysis. For scoring consistency, the negatively-worded items were reverse coded. The ICEQ scales were validated using an *Item Response Theory* model (IRT) called the *Rasch Rating Scale* (RSM) to establish their validity and reliability (Ben, 2020). The RSM defines the "probability of a specified response in relation to the ability of the test taker, and the difficulty of the test item" (Ben, 2020) and allows person and test items to be represented on the same continuum. Benefits of the RSM is that the model enables for a "more detailed item-level examination of the structure and operation of tests and survey scales" (Ben, 2020). Instead of using reliability coefficients (eg. Cronbach's Alpha) to indicate reliability, the Rasch RSM uses fit indices including infit statistics (Infit Mean Square), and T Statistic.

Statistical weighting was employed to ensure that variables with small sample sizes were weighted to allow comparison with larger sample sizes. Simple correlation analysis was conducted to explore the relationship between individual variables and to establish a basis for regression analysis. Univariate (multiple) regression analysis was conducted to explore the relationships of the variables, using the conceptual framework as a priori.

Findings

After establishing the validity of the scales; and items within the scales; and ensuring that correlations existed between the variables, multiple regression analysis was used to determine the relationship between one dependent variable with multiple independent variables (Sullivan, 2018; Field, 2013). The following equation was used (Jöreskog & Sörbom, 2006):

$$Y=B_0 + B_1X_1 + B_2X_2 + \ldots + Bn\,Xn + e$$

Where *Y* is the dependent variable and *X* the independent variable, B_0 is the constant obtained from the regression calculations, B_1, B_2 and Bn are the standardised regression coefficients (or the *beta* value) for the independent variables (also obtained from regression calculations), and *e* is the residual (or error). Independent and dependent variables were drawn from the conceptual framework presented in Figure 2. Findings in response to the RQ1 (exploring the relationship between learning routines, student motivation and academic achievement) are outlined in Figure 3.

		Student Motivation (Reading)	Student Motivation (Writing)	Student Motivation (Maths)
Learning Routine: **PRSN**	Pearson Correlation Significance		-.01	
Learning Routine: **PRTI**	Pearson Correlation Significance		-.05	-.07
Learning Routine: **INDP**	Pearson Correlation Significance	-.08	-.047	
Learning Routine: **INVS**	Pearson Correlation Significance	-.06	-.059	
Learning Routine: **DIFF**	Pearson Correlation Significance	-.056		

**Only significant correlations were indicated; N=285*

Figure 3. Correlation values of learning routines and student motivation.

A model of the findings from multiple regression analysis of learning routines, student motivation and academic achievement is outlined in Figure 4.

Student motivation and academic achievement

Regression analysis was used to establish the nature of relationship between student motivation in reading, spelling and mathematics, and academic achievement in these same domains. Findings examining academic achievement in reading as the dependent variable, and student motivation toward reading as the predictor, show that student motivation appears to have a statistically significant influence ($\beta_0 = 116.21$, $\beta_1 = 0.08$; $t = 2.43$, $p < 0.05$).

Therefore, a statistically significant finding exists between student motivation in reading and academic achievement in reading, but did not exist between student motivation in mathematics and academic achievement in mathematics;

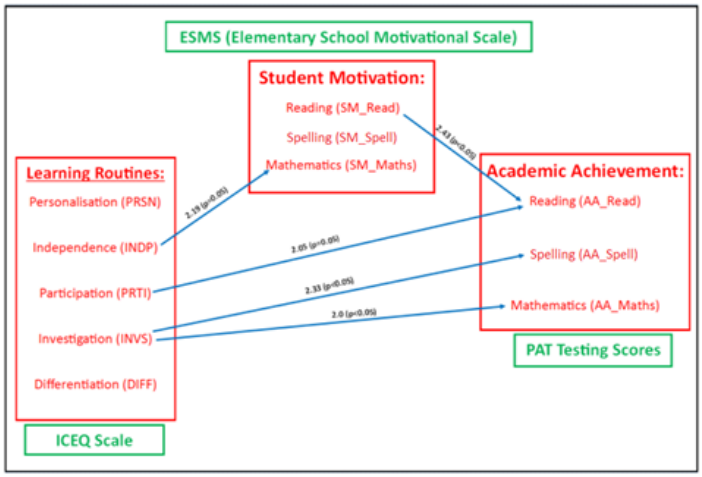

Figure 4. Model drawn from findings.

and student motivation in writing and academic achievement in writing. The possibility of multicollinearity was considered and tested in SPSS, and was not found (see Appendix 1 for factorial loadings).

Learning routines and academic achievement

Reading

Multiple regression analysis, considering academic achievement in reading as the dependent variable, and all the ICEQ items as the predictors, shows that participation appears to have a statistically significant influence ($\beta_0 = 32$, $\beta_1 = 0.09$; $t = 2.05$, $p < 0.05$) in the context of all the other learning routine variables. Therefore, findings indicate that learning routines which promote *personalization, differentiation, investigation* and *independence* were not statistically significant indicators of *academic achievement in reading*.

Spelling

Multiple regression analysis considering academic achievement in spelling as the dependent variable, and all the ICEQ items as the predictors, shows that investigation appears to have a statistically significant influence ($\beta_0 = 120.61$, $\beta_1 = 0.244$; $t = 2.0$, $p < 0.05$) in the context of all the other learning routine variables. Therefore, findings indicate that learning routines which promote *personalization, differentiation, participation* and *independence* are not statistically significant indicators of *academic achievement in spelling*.

Mathematics

As with *spelling*, regression analysis considering *academic achievement* in mathematics as the dependent variable, and all the ICEQ items as the predictors, shows that learning routines which promote investigation appear to have a statistically significant influence ($\beta_0 = 45.39$, $\beta_1 = 0.251$; $t = 2.33$, $p < 0.05$) in the context of all the other learning routine

variables. Therefore, findings indicate that learning routines which promote *personalization, differentiation, participation* and *independence* are not statistically significant indicators of *academic achievement in mathematics*.

Learning routines and student motivation

Multiple linear regression analysis was used to establish the relationship between learning routines and student motivation toward reading, spelling and mathematics. Results, when considering *student motivation in mathematics* as the dependent variable and all the ICEQ items as the predictors, indicate that *independence* appears to be statistically significant ($\beta_0 = 478.62$, $\beta_1 = 0.274$; $t=2.19$, $p<0.05$) in the context of all the other learning routine variables.

Therefore, a statistically significant finding existed between learning routines and student motivation in mathematics, but did not exist between learning routines and student motivation in reading or student motivation in spelling.

Discussion

The following discussion addresses the research questions put forward at the beginning of this paper, in relation to the findings of the study, and research examined in the literature review.

What is the link between learning routines, student motivation and academic achievement, in primary years?

Summary of findings:

- Student motivation can lead to academic achievement (*reading*).
- Learning routines, which promote participation (*reading*) and investigation (*mathematics and spelling*), can lead to academic achievement.
- Learning routines, which promote independence (*mathematics*) can lead to student motivation.

Firstly, findings of the current study suggest a link between student motivation and academic achievement, specifically in reading as, *student motivation in reading* was found to be a predictor of *academic achievement in reading*. As Dishon-Berkovits' (2014) research observes that student motivation, and subsequent academic achievement, is enhanced by teacher guided learning goals, one explanation for these findings might suggest that students in the specified context are experiencing academic achievement in reading as a result of teachers setting goals based on learning objectives rather than performance. An alternative explanation for the findings could be based on Tseng and Walsh's (2016) research, which suggests that students may be intrinsically motivated toward reading, seeing it relevant and interesting, as this is an essential component of the relationship between *student motivation* and *academic achievement*.

Secondly, findings of the study also suggest a link between learning routines and academic achievement. More specifically, *learning routines* which promote *participation* in *reading*, and *investigation* in *mathematics* and *spelling*, were found to be predictors of *academic achievement*. As Stoian's (2016) research suggests that learning routines which promote *participation* can positively influence academic achievement when combined with direct instruction, one suggestion for the findings of this study could indicate that, in the context of reading, teachers may be employing teacher-led routines. This may mean that teachers are establishing learning goals, leading the learning and allowing students time to consolidate content knowledge. It may also suggest that teachers are adhering to some of Rosenshine's (2012) principles for effective teaching, understanding that content mastery and teacher-directed learning experiences precede student-driven exploration of concepts.

Logar et al.'s (2018) research suggests that learning routines which promote *investigation* enhance academic achievement when educators have a clear understanding of the outcomes they intend to achieve. With this in mind, findings of this study may suggest that – in the context of *mathematics* and *spelling* – teachers may be planning and leading the learning with clear objectives in mind. When surveyed about whether stating learning intentions at the beginning of lessons was common practice, teacher responses were overwhelmingly positive, thus offering additional confirmation for the aforementioned suggestion. According to the findings of Adler et al. (2018) and Dishon-Berkovits (2014), it may also be inferred that teachers have a strong basis of content knowledge when approaching concepts in these two domains. Finally, Moon and Brighton's (2015) study of PBL in the context of primary years mathematics, suggests that investigative learning promotes academic achievement when the students find the content to be sufficiently challenging. Therefore, findings of this study may infer that teachers are planning challenging tasks which provide opportunities to uncover students' understanding and potential.

Finally, findings of the current study suggest a relationship between learning routines and student motivation. More specifically learning routines which promote *independence* in *mathematics*, were found to be predictors of *student motivation*. As Gardner and Jones' (2016) research suggests that student motivation is enhanced when students feel a personal connection to their learning environment, the findings of this study indicate that this may be the case in the specified context. An alternative suggestion for this finding may lie in Slavin's (1983) research, which suggests that learning routines, which promote *independence*, may incite *student motivation* in the presence of extrinsic motivation such as group rewards or individual accountability.

How do teachers establish learning routines that may lead to student motivation or academic achievement, in primary years?

Of the findings, it is important to note that *student motivation* is a predictor of *academic achievement* in only one domain; this being *reading*. Findings suggest that *academic achievement* and *student motivation*, in all other domains, is in response to learning routines (see Figure 4). This is critical to acknowledge as it outlines the importance of the teacher's role in establishing learning routines that may lead to *student motivation* or *academic achievement*. It suggests that how teachers establish learning routines, in the classroom, may be a more significant predictor of student motivation and/or academic achievement than the extent of an individual's personal level of motivation. With this in mind, teachers should be reminded to:

- Actively lead the learning.
- Exercise caution with learning routines that lead to student motivation in the absence of academic achievement.

When teachers lead the learning with rigorous objectives, student motivation and academic achievement is a more likely outcome (Trinter et al., 2015). In the Australian Primary School context, it can be tempting for educators to think that creating learning routines, where students choose experiences based on perceived interest and relevance, will incite motivation and academic achievement. However, Kirschner et al., (2006) explains that this is simply not the case. Overwhelmingly, minimally guided learning routines lack the opportunity for students to manipulate information from their working memory to long term memory. This is because student-centred routines often overwhelm working memory, significantly compromising the opportunity for new information to be transferred to long term memory, and retrieved when necessary. Kirschner et al.'s (2006) finding echoes Prain et al.'s (2013) claim that teacher expertise, guidance and instruction are the most influential predictors of academic achievement.

Therefore, when analysing the findings of this study in light of existing research, it may be suggested that if teachers use learning routines which engage students in direct instruction (Rosenshire, 2012; Brophy, 1986); provide clear learning outcomes (Dishon-Berkovits, 2014); and the opportunity for learners to cognitively process knowledge from working memory to long term memory (Kirschner et al., 2006), student motivation and academic achievement can be expected to follow. This may be regardless of whether a student deems the task or content engaging and relevant. It is with the foundation of teacher-led learning routines that Australian primary educators can be confident to design hands-on, experiential learning experiences (Rosenshire, 2012).

When determining how to establish learning routines that lead to student motivation and/or academic achievement, it is important for teachers to exercise caution when using routines that lead solely to student motivation in the absence of academic achievement. This is in response to the findings of this study, which suggest that *independence* is a statistically significant predictor of *student motivation* in *mathematics*, but not of *academic achievement*. As Baumann and Ballard's (1987) research claims that learning routines, which promote *independence*, are successful in the context of teacher-led and teacher-modelled practice, findings infer that teachers may need to re-evaluate what *independence* looks like in the classroom. Killian (2018) emphasizes that teacher-led practice requires that students engage first in explicit instruction, followed by guided practice, and ultimately move toward independence. However, as this study did not find *independence* to be a statistically significant predictor of *academic achievement*, it can be inferred that teachers may be confusing the concept of independent learning routines for students choosing how, when and what they learn (characteristics of what this study established to be student-centred learning routines), without clear objectives (Logar et al., 2018). Alternatively, when teachers design and lead learning routines (Adler et al., 2018) with clear expectations and objectives (Dishon-Berkovits, 2014; Logar et al., 2018), student motivation and academic achievement may be enhanced.

Conclusions and recommendations for action

When researching the relationship between learning routines, student motivation and academic achievement, findings of this study affirm the importance of the teacher. The findings reveal that what the teacher does in the classroom, by way of establishing learning routines, is a greater consistent predictor of student motivation and academic achievement, than a student's perception of how engaging or even how relevant they may deem the learning is to their lives. While the findings of this study do not mandate the abolition of student-centred learning routines in favour of exclusively teacher-led routines, the following recommendations are made:

Teachers to reconsider what student motivation is

It will be helpful for teachers to re-establish what it means to design learning experiences that are 'motivating' for students. Additionally, findings suggest that teachers should be cautious of learning routines that lead to student motivation in the absence of academic achievement. This means that while this study does not mandate the exclusive use of teacher-led learning routines in the absence of student-centred approaches, Australian primary school educators are urged to lead learning experiences with respect to cognitive architecture (Kirschner et al., 2006), ensuring that learning routines are based on clear learning goals (Dishon-Berkovits, 2014) and provide ample opportunity for the teacher modelling and guided instruction (Rosenshine, 2012). Essentially, when teachers are very clear on what, how and why they are engaging students in a learning task, students are more likely to be motivated toward this learning and academic achievement can be expected to follow.

Government to promote and support quality teaching in schools

Findings of this study reinforce the role of the teacher as the most influential factor of student academic achievement. The notion that students experience academic achievement simply when they find the learning task engaging or relevant is far too simplistic. Thus, teachers must be encouraged and supported to continually move toward proficiency in all Australian Professional Standards for Teachers (AITSL). The AITSL outline the importance of teachers knowing: students and how they learn (standard 1); content (standard 2); how to plan for effective teaching and learning (standard 3); creating and maintaining safe learning environments (standard 4); reporting and providing feedback on student performance (standard 5); the importance of engaging in professional learning (standard 6) and how to engage professionally with members of the school and wider community (standard 7). Government policy and funding should be directed toward ensuring teachers are supported and provided with adequate opportunities to develop proficiency in each of these standards.

It is absolutely essential that government policy makers and education ministers are aware of, and intune with, what current research says about the everyday challenges facing all educators in the classroom, regardless of context. Support and government funding needs to be offered on this basis, rather than political agenda.

Media to support teachers

The wider media plays a significant role in the public discussion of what constitutes quality teaching and learning. It is unhelpful for social commentators to entertain the notion that when *children have 'fun' at school, they are learning*. This, of course, does not negate the validity of teachers creating positive and safe learning environments for students (AITSL standard 4), but rather, highlights the importance of teachers to be seen as professionals, who use action-based research to inform decisions about which learning routines are used and why. This process would be more effective if teachers were supported and trusted in the public sphere, instead of being subjected to misinformed criticism.

Pre-service teacher education and training to develop a greater focus on teacher-led strategies

As the findings of this study reaffirm the importance of the teacher (and their establishment of learning routines) in relation to student motivation and academic achievement, it is important that the content of pre-service teacher training and education programs adequately reflect this. The heavy emphasis of student-centred learning, in the absence of teacher-led learning routines, in Australian Primary School Higher Education will be unhelpful. Instead, pre-service teachers need to understand the importance of content mastery (Rosenshine, 2012) and modelled practice (Stoian, 2016) preceding student-centred exploration of concepts. For example, teachers should establish and clearly state the learning outcome, rather than students exploring and discovering it for themselves. Additionally, teachers should teach students content so that their base of knowledge for individual or collaborative exploration of concepts is sufficient enough to yield quality outcomes.

Limitations

As this study relied on the use of secondary data, the research questions were bound to the nature of this existing data. While the questions were designed with the available data in mind, the constraints of secondary data analysis meant that there was no opportunity for additional data to be collected if further questions arose throughout the study. It is also important to acknowledge that this study was limited by its context. The ICEQ (Fraser, 1990) data was limited to only 15 responses, as that is the number of primary years teachers in the specified context. In addition, the teacher participants were majority female, which means that the study must recognise a potential gender bias toward females.

The ESMS (Guay, Marsh & Dowson, 2005) data collection was limited to the students willing to participate in the survey, and present at school on the day of administration. Absentees were not followed up. In addition, as teachers administered the scale with their students, a perceived limitation is on the commitment of individual teachers to ensuring that students accurately understood each question. Data collection may have been rushed or misunderstood, thus compromising its accuracy.

A complex array of factors may influence a student's motivation and achievement. Some factors include parental influence (Sung & Padilla, 1998; Al-Dhamit & Kreishan, 2013; Fan, Williams & Wolters, 2012), level of parental education (Al-Dhamit & Kreishan, 2013), socio-economic status (Berger & Archer, 2015), and work ethic (Tang, 1990).

Due to the vast array of teacher-led and student-centred routines, a delimitation was placed on which would be the focus of this study. Figure 1 shows the differences between teacher-led and and student-centred routines, as presented to teachers in the *Individualised Classroom Environment Questionnaire* (ICEQ) (Fraser, 1990). This delimitation was imposed to ensure that the study was specific enough to evaluate and inform current pedagogical decisions of the identified context. It was also necessary to impose this delimitation to ensure that the project was reasonable to complete within a specified timeframe. It is, however, important to recognise that taking into account other factors (such as student SES) may potentially change the data.

Recommendations for further study

As this study was conducted in only one context, the findings only pertain to this specific context. Therefore an opportunity exists to replicate the study across varying contexts to see if the results add weight to the findings discussed in this paper.

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