JOURNAL OF EDUCATION AND INNOVATION

Research Article

STUDENTS' ACADEMIC RISK TAKING AND NEEDS FOR ACADEMIC MANAGEMENT AT AN INTERNATIONAL SCHOOL IN BANGKOK

Received: April 20, 2023 **Revised:** June 3, 2023 **Accepted:** June 11, 2023

Kittaya Pawakranond[1*] and Dhirapat Kulophas[2]

[1,2]Faculty of Education, Chulalongkorn University, Bangkok 10330, Thailand

*Corresponding Author, E-mail: pkittaya@bromsgrove.ac.th

Abstract

Academic risk taking (ART) is a crucial behavior that promotes academic success and innovative skills. It is also defined as one of the 21st-century skills that students should have; therefore, schools must focus on developing ART behavior in the students through academic management. This research aimed to 1) determine the current secondary school students' ART level at Bromsgrove International School and 2) identify the needs for academic management development based on the concept of ART at Bromsgrove International School. Data was collected from 36 secondary teachers, eight management staff, and 90 mixed nationality students in Year 7 and 10 aged 11-16 using an online survey and was analyzed by frequency, percentage, average, standard deviation, and $PNI_{modified}$.

The result revealed that 1) the overall current level of students' ART in Year 7 and 10 was moderate, while Year 10 students' level of ART was slightly lower than Year 7 in all elements of ART. The highest ART component in students was Response to failure action (RFA) in Year 7 and 10 students. And 2) the overall current and desirable state were at a moderate and high level, respectively, with the highest need in the assessment and evaluation dimension, followed by curriculum development and teaching and learning. Affect had the highest need in overall academic management, especially in curriculum development and teaching and learning dimension, while Preferred Difficulty (PD) had the highest need in the assessment and evaluation dimension.

Keywords: Academic Risk Taking, Academic Management, International School

Introduction

Education quality is often prioritized in many countries, including Thailand, as it prepares citizens for overcoming challenges and rapid changes. One of the five aspirations in Thailand's National Education Plan AD 2017-2036 is to have a quality education that can develop learners to achieve their capabilities to meet the target academic achievement indicator. There are many variables related to academic achievement. Academic risk taking (ART) is one of the critical variables leading to academic success. Siong (2017, p. 1) suggested that academic success and ART behavior are related. Also, students with higher ART behaviors are more creative and have higher critical, innovative thinking skills (Deveci & Aydin, 2018, p. 560). Participating in new classes or activities, choosing challenging tasks or assignments, trying new solutions, willingness to share the idea regardless of being right or wrong, and asking teachers genuine questions are all linked to students' ART level, which subsequently contributes to their academic success.

Creativity and innovation skills are regarded as desired and necessary skills according to Thailand's National Education Standard AD 2021. However, it should be acknowledged that engaging in the creative process does not necessarily lead to successful solutions. Rarely good original, creative work or ideas come together on the first try (Smith & Henriksen, 2016, p. 7). So do the innovation process. Thus, ART is essential for learners to overcome potential failure and be willing to persist to achieve success. ART is often defined as a behavior of students and their desire to learn or do something new in uncertain situations that can lead to success or failure in order to learn and have the determination to go through failure and learn from failure. ART behavior describes the students' courage and unwillingness to quarrel against difficulties and their learning situations Korkmaz (as cited in Tay et al., 2009, p. 1100). Choosing a more difficult task reflects higher ART, increasing one's likelihood of making mistakes or obtaining a lower score (Siong, 2017, p. 1). Clifford (1991, p. 263) defined risk taking as increasing students' learning and motivation. Young (1991, p. 8) defined risk taking as the desire to go into the unknown, to try new and different things without focusing on success or failure. Learning is the reward of taking risks. All learning journeys are ART, as all learning involves moving to a new, previously unknown state. There are four dimensions of ART, which are Affect, Preferred Difficulty (PD), Proactive action (PA), and Response to failure action (RFA) (Abercrombie et al., 2022, p. 3).

At Bromsgrove International School, a privately-owned independent institution in Bangkok that follows the National Curriculum for England, ART has been highlighted as one of the students' essential characteristics. Bromsgrove International School aims to produce happy, moral, and creative citizens through enlightened, disciplined, and broad education. The school has an external accreditation from the Education Development Trust (EDT), auditing the school to ensure the quality of education. The audit is based on eight standards with a scale of Outstanding, Good, Satisfactory, and Unsatisfactory. In the recent visit in November 2019, most of the standards were rated outstanding. However, standard 1, the standards reached by students in their work and their progress, and standard 3, teaching and learning, related to the academic side of the school, were rated good. It has been regularly raised and remarked in the Head of Faculty meetings that secondary students insufficiently challenge themselves and are not making progress as much as they could,

especially after a long period of online learning during the COVID situation last year. Students do not participate enough in class or are unwilling to select challenging assignments or projects. Students should believe that the learning environment is conducive, mistakes are fixable, failure is typical, and they do not result in punishment or embarrassment. It is part of learning that will help learners originate their thinking and lead to rich learning experiences. Students with high ART levels are willing to participate in in-class activities even if there is a risk of failure Strum (as cited in Cetin et al., 2014, p. 147).

Students' perceptions of teacher support and learning environment are essential in ART. Bransford and Donovan (as cited in Beghetto, 2009, p. 214) observed that teachers in successful science classrooms cultivate "a culture of respect, questioning, and risk taking." ART is encouraged when students perceive that their teachers welcome tentative ideas and are committed to listening respectfully to what they say (Minstrell & Kraus, 2005, p. 476). The study's findings have indicated that students' perceptions of teacher support contribute significantly and uniquely to students' reported willingness to engage in ART. The role of the teacher is crucial to developing risk taking abilities. The teacher creates and establishes the classroom environment, encouraging or discouraging risk taking (Young, 1991, p. 12).

As ART leads to academic success and creativity growth, to achieve the EDT Standards 1 and 3, which are related to teaching and learning school, and to produce creative citizens as stated in the school's vision, building ART behavior in students will be a powerful tool to achieve these goals. Teaching and learning are the key elements of academic management which consist of academic operations, including curriculum development, teaching and learning, and assessment and evaluation. Because teachers and the learning environment directly impact the level of ART in students, developing academic management based on ART will subsequently increase the level of ART in students.

Objectives

1. To determine the current secondary school students' academic risk taking level at Bromsgrove International School.
2. To identify the needs for academic management development based on the concept of academic risk taking at the secondary school at Bromsgrove International School.

Conceptual Framework

There were two significant concepts underlying the conceptual framework of this study. These two concepts are academic management and academic risk taking.

Academic management comprises Curriculum Development, Teaching and Learning, and Assessment and Evaluation (Anannawee, 2014; Biggs, 1999; The Ministry of Education, 2007; Visetsiri, 2012). Academic management refers to managing all related academic activities and processes of the school to provide efficient teaching and learning to accomplish the school's academic missions and maximize student benefit. Curriculum

Development is the process of changing and improving the curriculum to suit the needs of students, school, and local conditions comprising of 1) determination of curriculum aims and objectives, 2) organizing course contents, 3) determination of extra-curricular activities, and 4) curriculum evaluation. Teaching and learning encompass providing teaching and learning, using instructional media and resources, and organizing an atmosphere that facilitates student learning. Finally, assessment and evaluation involve defining regulations and guidelines for assessment and evaluation and assessing and evaluating the educational tasks to promote the students' learning by providing feedback.

Academic risk taking consists of Affect, Preferred Difficulty, Response to Failure Action, and Proactive Action (Abercrombie et al., 2022). Academic risk taking (ART) refers to a learning behavior that places the students in a position where they would engage in academic actions with the possibility of failing to learn. As a result, they will not fear to make failure and will learn from failure. Affect is a student's adverse emotional reaction after experiencing failures in their learning activities, such as sadness, depression, despondency, dejection, grief, and hopelessness. Preferred Difficulty (PD) is defined as the preference of students to choose challenging tasks, complex actions, or complicated processes in their learning activities as they strive to learn. Response to Failure Action (RFA) encompasses positive actions that students respond to failure. This means students see failure as part of the learning process, learn from the failure, and have the determination to reflect on the failure on the next try. Proactive Action (PA) refers to actions in which students participate in classrooms or activities where the outcome is yet unknown so that failure has not necessarily occurred. These actions may include answering questions, asking questions in the classroom, and engaging in class discussions. It also refers to students' attempts to do or learn new things, their willingness to try new solutions to problems, or their taking a course of study in which they are not sure of success or failure.

Methodology

The study employed the descriptive research method. The population used in this research was eight management staff, 49 secondary teachers, and 96 secondary students in year 7 and 10 at Bromsgrove International School at Windsor Park Campus (Primary and Secondary Campus). The research instrument was developed from academic management and academic risk taking (ART) framework by reviewing various related concepts, theories, and literature. The instrument used in this procedure for students consists of 2 parts: 1) the respondent's background and 2) a five-point Likert scale questionnaire of students' level of ART derived from the School Failure Tolerance Scale developed by Clifford (1991) while the instrument used in this procedure for staff consisting of 3 parts: 1) respondent's background, 2) a five-point Likert scale questionnaire of the current state and the desirable state, and 3) suggested approaches for academic management development based on the concept of ART. The staff questionnaire was verified content validity by three qualified experts using the IOC form to ensure the level of reliability of the questionnaire. All questions have an IOC value greater than 0.50 or more, indicating that the questions can be used in this study. Cronbach's alpha coefficients were calculated for both questionnaires. Overall Cronbach's alpha coefficient of

the student's questionnaire questions was .914, and the staff's questionnaire questions was .963. Data were received from 36 secondary teachers, eight management staff, and 90 mixed nationality students in Year 7 and Year 10 aged 11-16 using an online survey and was analyzed using frequency, percentage, mean, standard deviation, and $PNI_{Modified}$.

Results

1. Current secondary school students' academic risk taking (ART) level at Bromsgrove International School

The overall current level of secondary students' ART was moderate (M = 3.191, SD = 0.993). The highest dimension was Response to failure action (RFA) (M = 3.470, SD = 0.975). The second highest dimension was Proactive action (PA) (M = 3.393, SD = 0.938), followed by Affect (M = 2.972, SD = 1.099). Finally, the lowest dimension was Preferred Difficulty (PD) (M = 2.929, SD = 0.962).

The overall level of ART in Year 7 students (M = 3.292, SD = 0.789) was slightly higher than in Year 10 students (M = 3.207, SD = 1.167). The highest dimension for Year 7 and Year 10 was RFA (M = 3.519, SD = 0.837 in Year 7, M = 3.374, SD = 1.187 in Year 10), followed by PA (M = 3.333, SD = 0.817 in Year 7, M = 3.293, SD = 1.126 in Year 10). For Year 7 students, the lowest dimension was Affect (M = 3.093, SD = 1.022), followed by PD (M = 2.943, SD = 0.908). While Year 10 students, the lowest dimension was PD (M = 2.900, SD = 1.056), followed by Affect (M = 2.730, SD = 1.191).

Table1 Summary of current level of secondary school students' academic risk taking at Bromsgrove International School

Year	Affect		PD		RFA		PA		Overall	
Group	M	SD	M	SD	M	SD	M	SD	M	SD
Year 7	3.093 (4) Moderate	1.022	2.943 (3) Moderate	0.908	3.519 (1) High	0.837	3.333 (2) Moderate	0.817	3.292 Moderate	0.789
Year 10	2.730 (3) Moderate	1.191	2.900 (4) Moderate	1.056	3.374 (1) Moderate	1.187	3.293 (2) Moderate	1.126	3.207 Moderate	1.167
Overall	2.972 (3) Moderate	1.099	2.929 (4) Moderate	0.962	3.470 (1) Moderate	0.975	3.393 (2) Moderate	0.938	3.191 Moderate	0.993

2. Needs for academic management development based on the concept of ART **at Bromsgrove International School**

The Modified Priority Need Index (PNImodified) to prioritize the needs for academic management development based on the concept of ART was calculated from the current state and desirable state of academic management collected from the management staff and teachers at Bromsgrove International School as shown in Table 2.

Overall, the priority needs index for academic management development at the Secondary level at Bromsgrove International School based on ART was 0.366. The highest priority was the assessment and evaluation dimension which had the highest priority needs index ($PNI_{Modified}$ = 0.418), and when considering the components of assessment and evaluation, assessment and evaluation tools had the highest priority needs index ($PNI_{Modified}$ = 0.552). While considering the components of ART, it was found that PD had the highest priority needs index ($PNI_{Modified}$ = 0.465). Next, curriculum development had the second highest priority needs index ($PNI_{Modified}$ = 0.364), and when considering the components of curriculum development, curriculum evaluation had the highest priority needs index ($PNI_{Modified}$ = 0.459). Next, while considering the ART components, it was found that Affect had the highest priority needs index ($PNI_{Modified}$ = 0.410). Lastly, the third was teaching and learning ($PNI_{Modified}$ = 0.315), and when considering the components of teaching and learning, using instructional media and resources had the highest priority needs index ($PNI_{Modified}$ = 0.356). While considering the ART components, Affect had the highest priority needs index ($PNI_{Modified}$ = 0.371). Needs prioritization of the academic management development sub-components based on the concept of ART was illustrated in Table 3.

Overall, the highest priority needs for the components of ART behavior to develop was Affect, followed by PA, RFA, and PD, respectively.

Table 2 Current state, desirable state, and need prioritization of the academic management development based on the concept of academic risk taking

		Academic risk-taking elements					
Academic management	**Items**	**Affect**	**PD**	**RFA**	**PA**	**Overall**	**Priority**
1. Curriculum development	Current state	3.142	3.477	3.284	3.347	3.313	
	Desirable state	4.426	4.563	4.477	4.551	4.504	
	$PNI_{Modified}$	0.410	0.317	0.367	0.364	0.364	2
2. Teaching and Learning	Current state	3.341	3.712	3.530	3.485	3.517	
	Desirable state	4.553	4.682	4.629	4.561	4.606	
	$PNI_{Modified}$	0.371	0.265	0.314	0.309	0.315	3

		Academic risk-taking elements					
Academic management	**Items**	**Affect**	**PD**	**RFA**	**PA**	**Overall**	**Priority**
3. Assessment and Evaluation	Current state	3.011	2.841	3.057	2.966	2.969	
	Desirable state	4.114	4.114	4.193	4.205	4.156	
	$PNI_{Modified}$	0.386	0.465	0.380	0.440	0.418	1

Table 3 Summary of needs prioritization of the academic management development sub-components based on the concept of academic risk taking

		Academic risk taking elements			
Components	**Items**	**Affect**	**PD**	**RFA**	**PA**
1. Curriculum development 0.364 (2)	1.1 Determination of curriculum aims and objectives 0.320 (4)	0.393 (1)	0.277 (4)	0.316 (2)	0.294 (3)
	1.2 Organizing course contents 0.350 (2)	0.418 (1)	0.245 (4)	0.354 (3)	0.384 (2)
	1.3 Determination of extra-curricular activities 0.329 (3)	0.361 (1)	0.310 (4)	0.324 (2)	0.322 (3)
	1.4 Curriculum Evaluation 0.459 (1)	0.470 (2)	0.437 (4)	0.473 (1)	0.455 (3)
	Overall	0.410 (1)	0.317 (4)	0.367 (2)	0.364 (3)
2. Teaching and Learning 0.315 (3)	2.1 Delivering teaching and learning to meet the aims of the curriculum 0.341 (2)	0.353 (2)	0.312 (4)	0.357 (1)	0.340 (3)
	2.2 Setting learning atmosphere and environment 0.248 (3)	0.276 (2)	0.188 (4)	0.240 (3)	0.288 (1)
	2.3 Using instructional media and resources 0.356 (1)	0.484 (1)	0.296 (4)	0.345 (2)	0.299 (3)
	Overall	0.371 (1)	0.265 (4)	0.314 (2)	0.309 (3)
3. Assessment and Evaluation 0.418 (1)	3.1 Defining regulation and guideline of evaluation 0.283 (2)	0.233 (4)	0.321 (1)	0.297 (2)	0.282 (3)
	3.2 Assessment and evaluation tools 0.552 (1)	0.539 (3)	0.609 (1)	0.463 (4)	0.598 (2)
	Overall	0.386 (3)	0.465 (1)	0.380 (4)	0.440 (2)
Overall	**0.366**	**1**	**4**	**3**	**2**

Discussions

1. The current secondary school students' academic risk taking (ART) level at Bromsgrove International School

The overall current level of secondary students' ART was moderate (M = 3.191). The highest dimension was RFA, followed by PA, Affect, and PD. One of the reasons the students had a moderate level of ART and got the two highest dimension in RFA and AP was that the school values the importance of being a risk-taker and being determined and have consistently promoted these behaviors in students since kindergarten ages. For many years, risk taking and determination have been two of the eight learner profile attributes schools have educated students and embedded in various school activities. Teachers have always evaluated and reported the levels of those attributes in the student termly report for students to monitor and develop them further. It helps to promote those attributes in students and encourage students to take a risk to participate in class and activities and enable students to have the determination to stick with their target even facing failure and to improve their performance from the failure or mistakes they have made. Also, Bromsgrove is a medium-sized school with a maximum class size of 15-25 students per class at the secondary level. With a small class size, the teachers can create a good relationship, build trust and provide individual encouragement and support to students, which makes the students feel safe and encourage PA. According to Beghetto (2009, p. 212), Students' perceptions of teacher support play a role in determining whether students will approach the risk.

The overall level of ART in Year 7 was slightly higher than in Year 10 students. This result aligned with Begheto's (2009, p. 217) that older students were less willing to engage in ART. Miller-Slough and Dunsmore (2016, p. 293) said friendship becomes particularly salient and influential during adolescence. Adolescents need acceptance from friends and society, so they feel more pessimistic about their failures or mistakes than younger ones. The highest dimension for Year 7 and Year 10 was RFA, followed by PA for the reasons explained above. Affect and PD were students' lowest and second lowest components in Year 7 and 10. Cultures also play an essential part here.

We have created a culture of error-free performance and perfect papers for decades. This creates a mindset of students to target perfect results and performance. They feel embarrassed and lose face when they make a mistake or fail, especially in public. The school needs to create a culture of respect when someone makes mistakes or fails, as it will help to reduce the negative feeling from failure that could occur. Challenging tasks come with a higher risk of failure, demanding more time and creating more stress; hence, the students try to avoid challenging tasks and prefer a level of challenge they are confident they can do correctly. The students need to be aware of the benefits of trying to challenge themselves and go to their boundaries to extend their learning to the next level. This aligns with the growth mindset concept from Dweck (2006) who mentioned that a growth mindset is a belief that intelligence is transformational through effort and anything can be learned. Learners with a growth mindset recognize their agency in the learning process and understand failure as necessary for improvement (Cornwall, 2018, p. 117). A growth mindset and ART often are found in tandem,

suggesting that helping students grow in their beliefs about learning can help influence their learning behaviors (Clark & Soutter, 2022, p. 51).

2. The needs prioritization of the academic management development based on the concept of ART at Bromsgrove International School

From the analysis, the highest priority needs of the academic management development based on the concept of ART was the assessment and evaluation dimension, and when considering the components of assessment and evaluation, assessment and evaluation tools had the highest priority need. No verified tool is used to assess students' ART levels and monitor their progress. Instead, the teachers observe the student's behavior at school and from the student's work to assess the level of students' ART. Practical assessment in the 21st century should use a variety of assessment instruments and tools so that the students can be assessed as accurately as possible in order for the students to use the assessment result to improve themselves in the future (Buathong, 2017, p. 1862). On the academic side, schools use a mixture of formative and summative assessments. A formative assessment is an assessment to determine the strengths and the areas of improvement. It is mainly used for development, focusing on providing feedback to students.

Formative assessment has a developmental purpose and is designed to help learners learn more effectively by giving feedback on their performance and how it can be improved and maintained. Formative assessments provide a "sandbox" and allow students to see that failure is not disastrous and that experimentation is worthwhile for its own sake and the sake of what might be discovered serendipitously along the way (Cornwall, 2018, p. 114). This encourages ART as students do not worry too much about their score from the assessment, and they see the benefits of taking the risk in the assessment, while this is not the case for summative assessment. If we want more effort from our students, we need to be more intentional about the value of process and risk in our classrooms, not only focusing on the result. We also need to educate parents so schools and parents can work together in the same direction to build ART attributes in students. Feedback is not always provided besides scores or marks, especially in summative assessments. It does not enable students to learn from the failure in their assignments/project works or exams as they do not know what they have done wrong or what they can improve. To promote ART, the school should focus more on formative assessment and provide high informational feedback in the assessment and evaluation process. High informational feedback (e.g., explanation for correct responses) is expected to elicit greater risk taking than low informational feedback (Clifford & Chou, 1991, p. 507). Some schools allow students to reflect on their mistakes and resubmit their work. It helps promote ART in students' learning.

For the components of ART, the highest need in the assessment and evaluation dimension was PD, as it is not easily seen or noticed from the outside. It is not easy for teachers to judge whether the students' difficulty level is challenging enough or not. Also, when it comes to assessment and evaluation, the students will focus on the scores and are not encouraged to take a challenging method or assignment as they do not want to risk getting a low score. Variable payoff (response scores increased with item difficulty) can also encourage students to take on challenging methods or projects as they have the potential to receive higher

scores compared to the easier ones. According to Clifford and Chou (1991, p. 503), Variable payoff increases ART.

Overall, the highest priority needs for components of ART behavior to develop was Affect, which was also the case for the curriculum development and teaching and learning dimensions. This result aligned with the current level of secondary students' ART at Bromsgrove analyzed from the survey, which showed that Affect was one of the two ART components with the lowest level in students. The curriculum development dimension had the second highest priority needs index. The findings reflect that the informant believes in developing students' Affect through curriculum development. Khantisampanno and Kositpimanvach (2023, p. 397) said the curriculum is vital in educational management at all levels because it is an outline that defines the framework to give knowledge and cultivate attitudes and values in students. Reducing students' potential negative attitude towards failure and mistakes needs to be addressed within the curriculum aims and learning objectives, and the curriculum evaluation process needs to allow teachers to reflect on aspects of the curriculum that reduce potential negative attitudes towards failure and mistakes from students. Schools need to educate students more about negative feelings that could occur from failure, tell them that it is acceptable to have these feelings, and teach them how to handle them and get over them. Addressing the objective of reducing students' potential negative feelings towards failure in the curriculum development dimension will enable students to understand more about the feelings and benefits of failure. It will help cultivate a better attitude toward failure. The school needs to provide a sandbox for the students to take risks and fail safely to cultivate this attitude in students.

Recommendations

1. Recommendations for policy and practices

1.1 Based on the results, the highest priority needs of academic management development is the assessment and evaluation dimension, and preferred difficulty (PD) was the highest needs when considering components of academic risk taking (ART) in assessment and evaluation. Therefore, educational policymakers should review and revise related assessment and evaluation guidelines to promote the values of the learning process (taking challenges, trying new things or new methods, having some failure/mistake, and learning from failure/mistake), and not only focus on the result (the error-free or prefect paper).

1.2 The findings found that assessment and evaluation tools had the highest priority need, and PD is the component of ART with the highest need in the assessment and evaluation dimension. Overall, Affect is the highest priority for components of ART behavior. However, these two ART components were the two lowest levels among the students. Therefore, the school management should focus on providing verified assessment and evaluation tools for teachers to assess Affect and PD in order for teachers to be able to assess the accurate level of these two components and to be able to monitor and develop these components further in students.

1.3 Affect was the component with the highest needs in most curriculum development and teaching and learning elements. For this reason, the school management should arrange a robust curriculum development and teaching and learning development involving all related stakeholders and have clear guidelines and objectives to ensure Affect is appropriately embedded in the curriculum and fostered through teaching and learning. In addition, schools must provide a safe environment for students to fail safely to reduce a negative attitude towards failure.

1.4 Research has shown that the lowest level of ART component in students was PD; So, teachers should use more formative assessment and variable payoff and always provide high informational feedback for students' exams/project works so students can learn from their mistakes/failures. This way, the students will appreciate the benefits of taking challenges and will help promote ART in students.

2. Recommendation for further studies

2.1 In this research, the data was collected from management staff, teachers, and students at the secondary level only. It would be more significant to collect data from the primary level and make a comparison to understand more about the level of ART in students of different ages and the needs of academic management development based on the concept of ART for different sections in school.

2.2 Future research should survey the students for the needs of academic management development to promote ART, as the perception from students could differ from teachers and management staff.

2.3 The priority needs of academic management development based on the concept of ART from this study should be used for future research to develop approaches for academic management development based on the concept of ART, which can be used by school management and teachers to develop ART levels in students.

References

Abercrombie, S., Carbonneau, K. J., & Hushman, C. J. (2022). (Re) Examining academic risk taking: Conceptual structure, antecedents, and relationship to productive failure. *Contemporary Educational Psychology*, 68, 102029.

Beghetto, R. A. (2009). Correlates of intellectual risk taking in elementary school science. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching*, 46(2), 210-223.

Buathong, S. (2017). Assessment and evaluation 21st century learning skills. *Veridian Electronic Journal , Silpakorn University*, 10(2), 1856-1867.

Cetin, B., Ilhan, M., & Yilmaz, F. (2014). An investigation of the relationship between the fear of receiving negative criticism and of taking academic risk through canonical correlation analysis. *Educational Sciences: Theory and Practice*, 14(1), 146-158.

Clark, S., & Soutter, M. (2022). Growth mindset & intellectual risk-taking: Disentangling conflated concepts. *Phi Delta Kappan*, 104(1), 50-55.

Clifford, M. M. (1991). Risk taking: Theoretical, empirical, and educational considerations. *Educational Psychologist*, 26(3-4), 263-297.

Clifford, M. M., & Chou, F. C. (1991). Effects of payoff and task context on academic risk taking. *Journal of Educational Psychology*, 83(4), 499.

Cornwall, S. (2018). Failing safely: Increasing theology and religious studies students' resilience and academic confidence via risk-taking in formative assessment. *Teaching Theology & Religion*, 21(2), 110-119.

Deveci, İ., & Aydin, F. (2018). Relationship between students' tendencies toward academic risk-taking and their attitudes to science. *Issues in Educational Research*, 28(3), 560-577.

Dweck, C. S. (2006). Mindset: The New Psychology of Success. New York: Random House Publishing Group.

Khantisampanno, P. N., & Kositpimanvach, E. (2023). Curriculum evaluation. *Journal of Modern Learning Development*, 8(3), 388-401.

Miller-Slough, R. L., & Dunsmore, J. C. (2016). Parent and friend emotion socialization in adolescence: Associations with psychological adjustment. *Adolescent Research Review*, 1, 287-305.

Minstrell, J., & Kraus, P. (2005). Guided inquiry in the science classroom. *How students learn: History, mathematics, and science in the classroom*, 475-513.

Siong, E. T. W. (2017). *The influence of global-local processing styles on academic risk taking* (Master thesis). Singapore: National University of Singapore.

Smith, S., & Henriksen, D. (2016). Fail again, fail better: Embracing failure as a paradigm for creative learning in the arts. *Art Education*, 69(2), 6-11.

Tay, B., Özkan, D., & Tay, B. A. (2009). The effect of academic risk taking levels on the problem solving ability of gifted students. *Procedia-Social and Behavioral Sciences*, 1(1), 1099-1104.

Young, R. D. (1991). *Risk-Taking in Learning, K-3.* NEA Early Childhood Education Series. ERIC.