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REGULAR ARTICLE

Validation of Attitudes and Beliefs on Classroom Control Inventory among Beginning Teachers in Singapore Schools

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Abstract Teachers' attitudes and beliefs on classroom management contribute significantly to student learning and development. Despite its importance, research in this aspect, however, has still been stymied by the difficulty of measuring teachers' classroom management attitudes and beliefs. Psychometrically sound instruments to measure teachers' classroom management attitudes and beliefs are still unavailable for use in Asian classrooms. In view of such reality, this study was intended to evaluate the psychometric properties of the Attitudes and Beliefs of Classroom Control Inventory-Adapted (ABCC-A) in Singapore schools. Construct validation of ABCC-A was conducted in three studies. Participants' responses to the 27-item ABCC inventory from the first-phase data collection ($N = 512$) were used in study 1 and study 2. Participants and their responses to the revised ABCC-A inventory from the second-phase data collection were used in study 3. In study 1, half of the first-phase data collection sample ($N_1 = 259$) was randomly selected for the exploratory factor analysis and reliability test. In the study 2, the other half of first-phase sample ($N_2 = 253$) will be used for the confirmatory factor analysis (CFA) test. In study 3, participants ($N_3 = 41$) who completed the revised ABCC-A, teacher efficacy scale, and questionnaire on teacher interaction questionnaires in the second-phase data collection will be used for convergent and discriminate validity tests. The CFA of ABCC-A revealed a good model fit of instruction management and people management subscales and acceptable evidence of invariance among different groups of beginning teachers in Singapore primary and secondary schools.

Keywords Attitudes · Beginning teachers · Beliefs · Classroom management · Secondary schools

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Introduction

Control and caring are the two opposing approaches commonly observed teachers' behaviors in classroom management (Bowers and Flinders 1990; McLaughlin 1991). Classroom management is a multifaceted construct that encompasses the teachers' managing of student behaviors and student learning inside the classrooms (Burden 2005; Evertson and Weinstein 2006; Good and Brophy 2006). Classroom management constitutes a major domain of teacher competence and effective teaching (Good and Brophy 2006). Past research conducted on beginning teachers (less than three years of teaching experience) had reported their concerns and low competence of classroom management (Evertson and Weinstein 2006; Jones and Jones 1998; LePage et al. 2005; Veenman 1984). Prior research has affirmed that beginning teachers' classroom management competence is largely mediated by their own attitudes and beliefs on classroom management (Martin and Baldwin 1992; Ritter and Hancock 2007; Smart 2009; Unal and Unal 2012; Urich and Tobin 1989; Wolfgang and Glickman 1986). To clarify, attitudes refer to the teacher's predispositions that consistently affect their actions (Jung 1971; Richardson 1996) and beliefs refer to the teachers' psychological propositions or thought processes that serve as lenses for interpreting their own

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experiences and making sense of the world (Jung 1971; Richardson 1996). Despite that attitudes and beliefs are distinguished and researched separately in the previous teacher education literature (attitude is often considered as affective domain, whereas beliefs are considered as cognitive domain), nevertheless, both teachers' attitudes and beliefs are equally important to influence their classroom management practices in classroom management research. In this study, we choose to examine the beginning teachers' attitudes and beliefs collectively.

Research posited that beginning teachers' attitudes and beliefs toward classroom management could ultimately affect their classroom management (Crow 1991; Martin 2004; Urich and Tobin 1989). This had also led to the development of Attitudes and Beliefs on Classroom Control (ABCC) inventory (Martin et al. 1998, 2006, 2007; Martin and Sass 2010). Extensive studies were conducted on Western teachers' attitudes and beliefs on classroom management using ABCC inventory. Some cross-cultural contrastive studies on ABCC inventory have suggested that teachers' perception of "effective" classroom management styles may be differed and influenced by cultures (Chen 1995; Shin and Koh 2007). Such research seems to be particularly stymied by the unavailability of culturally responsive, valid and reliable ABCC inventory in the Asian context. To extend research on ABCC at the international level, there is a need for more in-depth investigations of Asian teachers' classroom management attitudes and beliefs using locally validated ABCC inventory is thus well warranted. Even though many validation studies have been conducted on ABCC inventory (Martin et al. 1998, 2007; Savran and Cakiroglu 2003), however, few of them are without psychometric problems. Thus far, limited studies have examined and ensured the consistency of the revised ABCC inventory by comparing its items with that of other previously validated versions of ABCC inventory. The absence of such a step would arguably threaten the final item stability of ABCC inventory.

In view of this current research gap, this study intends to validate a revised ABCC inventory within Singapore context and contribute an appropriate instrument with stable psychometric properties for measuring Asian teachers' classroom management attitudes and beliefs. Specifically, this study aims to evaluate the psychometric properties of the Attitudes and Beliefs of Classroom Control Inventory-Adapted (ABCC-A) by using exploratory and confirmatory factor analyses. Moreover, to ensure the stability of our revised version of ABCC-A inventory, we will conduct a preliminary screening by comparing the theorized ABCC item classification (Martin et al. 1998) with that of two reduced versions of ABCC inventory (Martin et al. 1998, 2007). This study will also verify the ABCC-A among different groups of beginning teachers in Singapore. Hopefully, through above efforts, our study will contribute some new insights to the existing knowledge based on ABCC validation research and create some momentum for further research along this line.

Literature Review

Conceptualization of Classroom Management and Control

According to Martin and Baldwin (1993), teachers' classroom management can be classified broadly into three types, noninterventionist, interventionist, and interactionist. These three types form a control continuum ranging from low to high teacher control. Noninterventionist approach presupposes that students have the inner capacity to control their own behaviors and make their own decisions for their personal growth, and thus teachers should be less involved in regulating student behaviors. Conversely, the interventionist type posits that students' growth and development is the result of external regulations. Thus, the teachers should be fully involved in regulating students' behaviors. Teachers are believed to be more capable of choosing what is best for their students' development. Midway between these two types, the interactionist postulates that both teachers and students are responsible for students' in-class behaviors. Thus, both student's self-control and teacher power should be used collectively to frame students' development. Under different classroom conditions, teachers were reported to exhibit characteristics associated with certain classroom management approaches but they were also more likely to use one dominant approach (Wolfgang and Glickman 1986). Previous research also suggested that teachers' classroom management approaches could influence their classroom management attitudes and beliefs and that the outcomes of their practices may either further reinforce or change their attitudes and beliefs (Henson 2003; Martin et al. 1998).

From the behaviorist theory, control refers to teachers' attempt to stop, reduce, and correct students' misbehavior and maintain desirable behaviors and orderly classroom environment through strict rule-/expectation-setting (Nie and Lau 2008, 2009). Influenced by the social cognitive theory, the caring approach refers to teachers' attempts to be sensitive to students' needs for relatedness through showing friendliness, care, support, and respect to their students (Nie and Lau 2008, 2009). Although both approaches are equally beneficial for effective classroom management in the literature, the control approach is still predominant in the teachers' classroom management. They perceived that creating an atmosphere of control through exercising maximum power and teacher-instituted

classroom procedures is still the key to effective classroom management (Brophy 1988). They believed that high-teacher control not only reduce students' misbehaviors but also increase students' desirable behaviors (Barber et al. 1994; Jang and Jeon 2008; Nicholls and Houghton 1995). School administrators alike also consider teachers' exhibition of high control as an indicator of their professional competence (McCaslin and Good 1992). Considering teachers' overwhelming inclination toward the control approach, many empirical studies were conducted in the western context to verify the role of control approach for effective classroom management (Barber et al. 1994; Jang and Jeon 2008; Lewis et al. 2008; McCaslin and Good 1992; Nicholls and Houghton 1995). However, due to the varied operationalization and measurement of control approach across studies, inconsistent findings were generated. Thus, further research with consistent operationalization and measurement of the control approach is warranted. In this aspect, the western construct-ABCC inventory is increasingly recognized as a valid and reliable instrument to measure teachers' control orientation to classroom management, and thus more studies that utilize the ABCC inventory to explore the role of control approach to effective classroom management are called for. Likewise, since the existing literature has been largely based on the western context, the applicability of their findings to Asian teachers and Asian classroom contexts remains unknown. Thus, more similar studies exploring Asian teachers' conception are needed. Moreover, given the cultural differences are observed between Western and Asian teachers' classroom management beliefs and practices (Chen 1995; Shin and Koh 2007), how the Asian teachers perceive the effects of the control approach to effective classroom management is worthwhile investigating. Thus, validating ABCC inventory in the Asian context such as Singapore is pertinent. In this study, we intend to evaluate the psychometric properties of a Singapore version of ABCC-A and conduct a preliminary validity study of the ABCC-A among Singapore beginning teachers.

Attitudes and Beliefs on Classroom Control (ABCC) Inventory

The Attitudes and Beliefs on Classroom Control Inventory was first developed by Martin et al. (1998) based on their synthesis of Wolfgang and Glickman's (1986) conceptual framework of teachers' beliefs on discipline and their own classroom experiences. This 48-item instrument was specifically created to differentiate whether teachers' classroom management style is interventionist, interactionist, or noninterventionist on a four point likert scale. In this inventory, classroom management was conceptualized as encompassing three dimensions, namely, instruction management (IM) (refers to how teacher manage the instructional routines, including how teachers establish classroom procedures, manage seating, allocate learning topics and materials, and monitor homework submission); people management (PM) (refers to what teachers believe about students as persons and teachers' roles in nurturing students through teacher–student interactions); and behavior management (refers to the teachers' preplanned efforts that aimed to prevent misbehaviors, including facets such as teachers' beliefs about whether they should intervene in students' inappropriate behaviors, whether students' opinions should be considered in setting rules). The original ABCC inventory was made up of three subscales that corresponded to the three proposed dimensions of classroom management. Immediately after creating the ABCC inventory, Martin et al. (1998) validated it among American certified teachers using exploratory factor analysis (EFA), which resulted in a validated 26-item ABCC inventory.

Extensive investigations were conducted on the teachers' attitudes and beliefs on classroom management in the United States (Martin and Sass 2010; Martin et al. 2007). Other researchers also reexamined the original ABCC Inventory (Martin et al. 1998) for use among the different teacher groups in other countries (Henson 2003; Savran and Cakiroglu 2003). For example, Savran and Cakiroglu (2003) have explored the use of the ABCC inventory among Turkish pre-service teachers. Their results indicated a two-factor structure for the Turkish ABCC inventory (retained instruction and PM dimensions). Despite of the different results obtained from Martin et al. (1998) original three-factor structure proposition, it was reported that behavior management subscale was reported to be the weakest among the three factors (Henson 2003; Savran and Cakiroglu 2003). To refine the ABCC inventory, Martin et al. (2007) created the Attitudes and Beliefs on Classroom Control Inventory-Revised (ABCC-R) for the American in-service teachers. A revised 20-item ABCC (ABCC-R) consisting of two subscales, IM and PM was obtained. In view of the varied validation results, Martin et al. (2007) suggested that additional ABCC validation research be conducted among teacher groups from different social contexts so that more can be learnt about its subscales' psychometric properties.

Despite of the extensive research on ABCC conducted in the western context (Gencer and Cakiroglu 2007; Martin and Sass 2010; Martin et al. 1998, 2007; Ritter and Hancock 2007; Savran and Cakiroglu 2003), there was no research conducted in Asia. Research was particularly stymied by the shortage of culturally responsive, valid, and reliable ABCC inventory. Since researchers highlighted that teachers' attitudes and beliefs on classroom management may be influenced by the unique cultures (Chen 1995;

Shin and Koh 2007), we question the applicability of the western-based ABCC inventory to teachers in Asian countries such as Singapore. Thus, a revised ABCC inventory with stable psychometric properties was required for the Singapore context. Although many validation studies on the ABCC inventory were conducted (Martin et al. 1998, 2007; Savran and Cakiroglu 2003), few of them had examined the consistency of the revised ABCC inventory, consequently, the item stability suffers. In view of all these limitations, this study intends to evaluate the psychometric properties of a Singapore version of the ABCC-A. Moreover, to improve the stability of the ABCC-A inventory, an item consistency-checking procedure is included in the current validating procedure. Hopefully, through such efforts, our study will contribute new insights to the existing knowledge base and create new significant momentum for the ABCC research.

Methods

Participants

The participants are made up of beginning teachers who came from two phases of data collections. Beginning teachers in this study are teachers who are in their first/second/third full year of teaching after having received a degree certifying that they are fully qualified to teach. The rationale of choosing beginning teachers as our target sample is twofold. First, beginning teachers were generally reported to have been unprepared and struggled with classroom management in their first years of teaching career. Knowledge of classroom management problems faced by beginning teachers may thus provide important information in the improvement and redesigning of pre-service and in-service teacher training programs. Second, convenient sampling was used in this study. Since beginning teachers are the focus of this funded research project, they are the only sample we could have access to. The first phase involved 512 beginning teachers (157 males, 351 females, the other 4 teachers' gender information is not provided). Among them, most participants were from the 21–25 (37.1 %) and 26–30 (41.6 %) age groups, and a small number of them were from 31–35 (8.2 %), 36–40 (6.1 %), 41–45 (3.5 %), 46–50 (2.1 %), and 51–55 (0.4 %) age groups. The majority of participants are Chinese (79.7 %), followed by Malay (11.3 %), Indian (5.9 %), Eurasian (0.6 %), and other ethnic groups (2.1 %). 325 teachers were in their first career and 182 were in their second career as teachers, the other 5 teachers' career-nature information is missing; 193 teachers were teaching in primary schools, and 314 teachers were teaching in secondary schools, the rest of 5 teachers' relevant information is not provided. Using convenient sampling, the construct validation in the second phase involved another sample of 41 beginning teachers (17 males and 24 females). Most participants in this sample were from the 21–25 (39.0 %) to 26–30 (46.3 %) age groups, and a small number of them were from 31–35 (7.3 %), 36–40 (2.4 %), 41–45 (2.4 %), and 46–50 (2.4 %) age groups. Most participants are Chinese (87.8 %), followed by Malay (7.3 %), Indian (2.4 %), and other ethnic groups (2.4 %). 27 teachers were in their first career and 13 teachers were in their second career as teachers except one teacher whose relevant information is not provided. All of them were teaching in secondary schools.

Measures

Attitudes and Beliefs on Classroom Control (ABCC) Inventory

To optimize the psychometric properties of the ABCC-A inventory, we based our item selection on a prior selection of consistently classified items among three versions of ABCC inventories, namely Martin et al. (1998) original ABCC inventory, Martin et al. (1998) validated version, and another validated ABCC version by Martin et al. (2007). In all three inventories, classroom management was defined as a construct consisting of the following three components,

- IM: how teacher manage the instructional routines and tasks, including how teachers establish classroom procedures, manage seating, allocate learning materials, and monitor homework submission;
- PM: what teachers believe about students as persons and teachers' roles in nurturing students through teacher–student interactions;
- Behavior management: teachers' preplanned efforts to prevent misbehaviors, including facets such as teachers' beliefs about whether they should intervene in students' misbehaviors, whether students' opinions should be considered in setting rules.

Martin et al. (1998) original classification of the ABCC inventory is displayed in the "Original" column of Table 1. To validate this ABCC inventory, Martin et al. (1998) conducted an exploratory factory analysis (EFA) in the same study. Three factors were extracted and the cutoff factor loading score was set at 0.35. As a result, 14, 8, and 4 items were, respectively, retained for instruction, people, and behavior management dimensions. The reliability tests were conducted and the Cronbach's alphas were 0.82, 0.69, and 0.69 for instruction, people, and behavior management dimensions, respectively. The validated classification of the ABCC items is shown in the "A1" column of Table 1.

Table 1 Properties of the original ABCC Items in current study and review of item dimension classification in previous studies

No.	Statements	Original	A1	A2	Consistently classified items	Mean	SD
1	Student interaction should be kept to a minimum because it can easily lead to disruption in the classroom	PM					
2	I believe teachers should nurture and encourage student independence and self-expression	PM					
3	I believe the teacher should direct the students' transition from one learning activity to another	IM	IM	IM	IM	4.12	0.62
4	If a student sat at my desk, it would be okay	IM					
5	I believe the teacher should keep in mind that student's emotions and decision-making processes are not yet fully developed	PM					
6	I believe it's important to continuously monitor students' learning behavior during seatwork	IM	IM	BM	IM	4.16	0.57
7	If students believe that a classroom rule is unfair, I may explain the reason for the rule but would not change it	BM		IM			
8	I believe students should create their own daily routines as this fosters the development of responsibility	IM	PM	PM	PM	3.80	0.79
9	When students behave appropriately, I will most likely do nothing since good behavior is its own reward	BM					
10	When a student is repeatedly off-task, I will most likely remove a privilege or require detention	BM		IM			
11	The classroom runs more smoothly when the teacher assigns students specific seats	IM		IM	IM	3.88	0.76
12	I believe general classroom guidelines are preferable to strict rules	BM					
13	I believe teachers should provide clear, specific feedback regarding the quality of student's work	IM					
14	I believe students will be successful in school if allowed the freedom to pursue their own interests	PM	PM	PM	PM	3.61	0.81
15	I believe the teacher should decide what topics the students study and the tasks involved	IM	IM	IM	IM	3.60	0.76
16	During the first week of class, I will announce the classroom rules and inform students of the penalties for disregarding the rules	BM	IM	IM	IM	4.17	0.74
17	I believe the primary purpose of homework is to provide supplementary activities that enhance students' learning	IM					
18	I believe teachers should give students freedom so they will develop their own ways of interacting with each other	PM		PM	PM	3.62	0.75
19	The teacher knows best how to allocate classroom materials and supplies to optimize learning	IM	IM	IM	IM	3.80	0.68
20	I do not specify a set time for each learning activity because that can only be determined by the students	IM		PM			
21	I believe that friendliness, courtesy, and respect for fellow students is something that teachers should demand	PM					
22	When a student does not complete an assignment on time, I will assume that the student has a good reason	IM		PM			
23	When a student bothers other students, I will immediately tell the student to be quiet and stop it	BM	IM	IM	IM	3.58	0.80
24	I believe class rules stifle the student's ability to develop a personal moral code	BM	PM				
25	While teaching a lesson, a student begins to talk about her own work. I would remind the student that the class has to finish the lesson before the end of the class period	IM	IM	IM	IM	3.66	0.78
26	I believe teachers should require student compliance and respect for law and order[a]	BM	IM	IM	IM	4.09	0.55
27	When moving from one learning activity to another, I will allow students to progress at their own rate[a]	IM	PM	PM	PM	3.00	0.92
28	I would be annoyed if a student sat at my desk without permission[a]	IM					
29	I believe student's emotions and decision-making processes must always be considered fully legitimate and valid[a]	PM		PM	PM	3.59	0.83
30	I believe students can manage their own learning behavior during seatwork	IM		PM			

Table 1 continued

No.	Statements	Original	A1	A2	Consistently classified items	Mean	SD
31	If students agree that a classroom rule is unfair, then I would replace it with one that students think is fair[a]	BM	BM	IM	BM	3.10	0.93
32	Rewarding those students who behave appropriately is a good strategy for preventing misbehavior[a]	BM		BM	BM	3.92	0.73
33	I believe students need the structure of a daily routine that is organized and implemented by the teacher[a]	IM	IM	IM/ BM	IM	4.08	0.63
34	When a student is repeatedly off-task, I will most likely talk with the student to find out why[a]	BM					
35	I allow students to select their own seats[a]	IM	PM				
36	When students behave appropriately, I will provide a reward of some kind such as points toward a party or free time[a]	BM	BM	BM	BM	3.73	0.73
37	I believe students should judge the quality of their own work rather than rely on what the teacher tells them[a]	IM	PM	PM	PM	3.50	0.87
38	I believe students will be successful in school if they listen to the adults who know what's best for them[a]	PM	IM	IM	IM	3.33	0.82
39	I believe students should choose the learning topics and tasks	IM	BM	PM			
40	During the first week of class, I will allow the students to come up with a set of classroom rules[a]	BM	BM	IM/ BM	BM	3.80	0.79
41	I believe the primary purpose of homework is to provide drill and practice of skills learned in the classroom[a]	IM	IM		IM	3.68	0.81
42	I believe that students need direction in how to work together[a]	PM	IM	BM			
43	Students in my classroom are free to use any materials they wish during the learning process[a]	IM	PM	PM	PM	3.37	0.87
44	I specify a set time for each learning activity and try to stay within my plans[a]	IM	IM	IM	IM	4.02	0.52
45	I believe friendliness, courtesy, and respect for fellow students is something that students have to learn first-hand through free interaction[a]	PM	PM	PM	PM	4.14	0.62
46	When a student does not complete an assignment on time, I will deduct points from their grade[a]	IM		IM	IM	2.82	0.97
47	When a student bothers other students, my first reaction would be to say nothing and let the students work it out themselves[a]	BM					
48	I believe class rules are important because they shape the student's behavior and development[a]	BM	IM	IM	IM	4.20	0.53

$N = 413$

Original the original dimension classification as was designed in the Martin et al. (1998) study, *A1* refers to the article 1-the finalized dimension classification in the Martin et al. (1998) study, *A2* refers to the article 2-The finalized dimension classification in the Martin et al. (2007) study, *IM* instruction management, *PM* people management, *BM* behavior management

[a] Reversely coded scores

As a continuation of construct validation, the original ABCC inventory (Martin et al. 1998) was reexamined by Martin et al. (2007). Similarly, an EFA was conducted and three factors were extracted with the cutoff factor loading score set at 0.40. Consequently, 10, 10, and 4 items were retained for instruction, people, and behavior management dimensions, respectively. However, behavior management dimension was removed due to its poor construct. Cronbach's alphas of the remained IM and PM were 0.78 and 0.77, respectively. Martin et al. (2007) final classification of the ABCC items is shown in the "A2" column of Table 1. Given the cutoff factor loading score of Martin et al. (2007) study is higher than that of the Martin et al. (1998) study (0.40 versus 0.35), we labeled Martin et al. (2007) classification of items with factor loading scores between 0.35 and 0.40 in the "A2" column of the Table 1.

Comparison across three classification results (displayed in columns "Original", "A1", and "A2" of Table 1) showed that 15 items, 8 items, and 4 items were consistently loaded to IM, PM, and behavior management dimensions, respectively. The results are displayed in the "Consistently Classified Items" column in Table 1. The inconsistency of the item classification reflects the instability of items. Thus, to improve the stability of our revised

ABCC inventory, only the 27 consistently classified items were selected in this study for further validation.

Teacher Efficacy Scale (TES)

To provide convergent and discriminate validity evidence for our adapted ABCC inventory, personal teacher efficacy (PTE) data was also collected through the 16-item PTE subscale of teacher efficacy scale (TES) developed by Gibson and Dembo (1984). Cronbach's alpha retained in this study was 0.82. Teaching Efficacy here refers to "the extent to which the teacher believes he or she has the capacity to affect student performance" (Berman et al. 1977, p. 137). PTE refers to teachers' beliefs in their ability to bring about positive student learning outcomes (Gibson and Dembo 1984). Numerous studies indicated that personal teaching efficacy was positively correlated with instruction and PMs of ABCC inventory (Gencer and Cakiroglu 2007).

Questionnaire on Teacher Interaction (QTI)

To provide convergent and discriminate validity evidence for our adapted ABCC, positive teacher student interaction data was also collected through the positive subscales (QTI-positive, including leadership, helping/friendly, understanding, and student responsibility/freedom subscales) of questionnaire on teacher interaction (QTI, developed by Wubbels et al. 1991). QTI is a construct to measure teacher's classroom interaction behavior with students. QTI-Positive is composed of 24 items. Cronbach's alpha retained in the current study was 0.85. It is conceivable that PM would be related to higher positive teacher–student interaction scores. Since there has no previous empirical evidence for the correlation between teacher's classroom management and teacher–student interaction, this study may provide novel insights into this topic.

Validation Procedure

Construct validation of ABCC-A will be processed in three studies. Participants and their responses to the 27-item ABCC inventory from the first-phase data collection ($N = 512$) will be used in the study 1 and study 2. Participants and their responses to the revised ABCC-A inventory from the second-phase data collection will be used in the study 3. In the study 1, half of the first-phase data collection sample ($N_1 = 259$) will be randomly selected for the EFA and reliability test. In the study 2, the other half of first-phase sample ($N_2 = 253$) will be used for the CFA test. In the study 3, participants ($N_3 = 41$) who completed the revised ABCC-A, TES, and QTI questionnaires in the second-phase data collection will be used for convergent and discriminate validity tests.

Study 1

Data Analytic Plan

In the study 1, a reliability test was first conducted with half of the first-phase data collection sample ($N_1 = 259$) to determine whether behavior management subscale of the ABCC inventory should be deleted or combined with PM (Henson 2003; Martin et al. 2007; Savran and Cakiroglu 2003). Second, the EFA was conducted with the same sample. Items with low or cross factor loadings were deleted. Third, another reliability test was conducted for the finally selected items for each dimension of ABCC-A.

Results

Behavior Management Dimension

Behavior management dimension was reported to be the most problematic dimension in the previous literature. Consequently, researchers suggested that this dimension should either be deleted or combined with PM (Henson 2003; Martin et al. 2007; Savran and Cakiroglu 2003). In this study, both methods were tried and reliability test results were compared. Our results support the deletion of behavior management dimension (Cronbach's alpha is 0.76 for the PM items and Cronbach's alpha was 0.64 for the combined PM and behavior management items). Thus, only the 15 items for IM (Cronbach's alpha was 0.70) and 8 items for PM (Cronbach's alpha was 0.76) were retained.

Exploratory Factor Analysis

To refine the remaining items, exploratory factor analyses were conducted with 15 IM items, and 8 PM items. Principal component analysis with varimax rotation was used, and the cutoff factor loading score was set to 0.40. The total variance explained was 29.81 %. The results are displayed in Table 2. Among the 23 items, six items in total were deleted due to low factor loadings (which included item 15, 23, 25, 27, 41, and 46). Out of the preselected 15 items on IM, 10 loaded to factor one, labeled as IM (consisted of items 3, 6, 11, 16, 19, 26, 33, 38, 44, and 48). Out of the 8 items on preselected PM, 7 loaded to factor two, labeled as PM (included items 8, 14, 18, 29, 37, 43, and 45). Finally, 17 items were retained for our revised ABCC-A after the construct validation.

Table 2 EFA result

Item no.	Statements	Components	
		IM	PM
3	I believe the teacher should direct the students' transition from one learning activity to another	0.53	
6	I believe it's important to continuously monitor students' learning behavior during seatwork	0.54	
11	The classroom runs more smoothly when the teacher assigns students specific seats	0.50	
15	I believe the teacher should decide what topics the students study and the tasks involved		
16	During the first week of class, I will announce the classroom rules and inform students of the penalties for disregarding the rules	0.50	
19	The teacher knows best how to allocate classroom materials and supplies to optimize learning	0.51	
23	When a student bothers other students, I will immediately tell the student to be quiet and stop it		
25	While teaching a lesson, a student begins to talk about her own work. I would remind the student that the class has to finish the lesson before the end of the class period		
26	I believe teachers should require student compliance and respect for law and order	0.60	
33	I believe students need the structure of a daily routine that is organized and implemented by the teacher	0.53	
38	I believe students will be successful in school if they listen to the adults who know what's best for them	0.48	
41	I believe the primary purpose of homework is to provide drill and practice of skills learned in the classroom		
44	I specify a set time for each learning activity and try to stay within my plans	0.52	
46	When a student does not complete an assignment on time, I will deduct points from their grade		
48	I believe class rules are important because they shape the student's behavior and development	0.58	
8	I believe students should create their own daily routines as this fosters the development of responsibility		0.74
14	I believe students will be successful in school if allowed the freedom to pursue their own interests		0.73
18	I believe teachers should give students freedom so they will develop their own ways of interacting with each other		0.72
27	When moving from one learning activity to another, I will allow students to progress at their own rate		
29	I believe student's emotions and decision-making processes must always be considered fully legitimate and valid		0.62
37	I believe students should judge the quality of their own work rather than rely on what the teacher tells them		0.63
43	Students in my classroom are free to use any materials they wish during the learning process		0.52
45	I believe friendliness, courtesy, and respect for fellow students is something that students have to learn first-hand through free interaction		0.85

Reliability Test

After deleting the items with problematic factor loadings, the items for both dimensions were finalized. Reliability test was conducted again for the finalized items. The Cronbach's alphas were 0.71, 0.71, and 0.82 for the total ABCC-A, instruction, and PM subscales, respectively. The results suggest that the internal consistency of the ABCC-A and its subscales are acceptable.

Study 2

Data Analytic Plan

In the study 2, confirmatory factor analysis (CFA) was first conducted to the other half of the first-phase sample ($N_2 = 253$) to examine the structural validity of the revised ABCC-A inventory. Second, multigroup invariance test was conducted with this sample to explore whether the revised ABCC-A was operating equivalently among various groups of teachers.

Results

Confirmatory Factor Analysis

Based on the study 1 results, CFA was conducted using IBM Amos 21 to confirm the final selection of items for ABCC-A inventory. The equivalence of the revised inventory was tested across different groups of teachers. Results of the CFA showed that all factor loadings were significant, and the correlation between IM and PM is -0.13 ($p < 0.05$). Results also showed that the measurement model fits the data well: $\chi^2 = 134.37$ $p > 0.05$, $\chi^2/df = 1.14$, CFI $= 0.98$, and RMSEA $= 0.02$. The measurement model and the factor loadings of each item are displayed in Fig. 1.

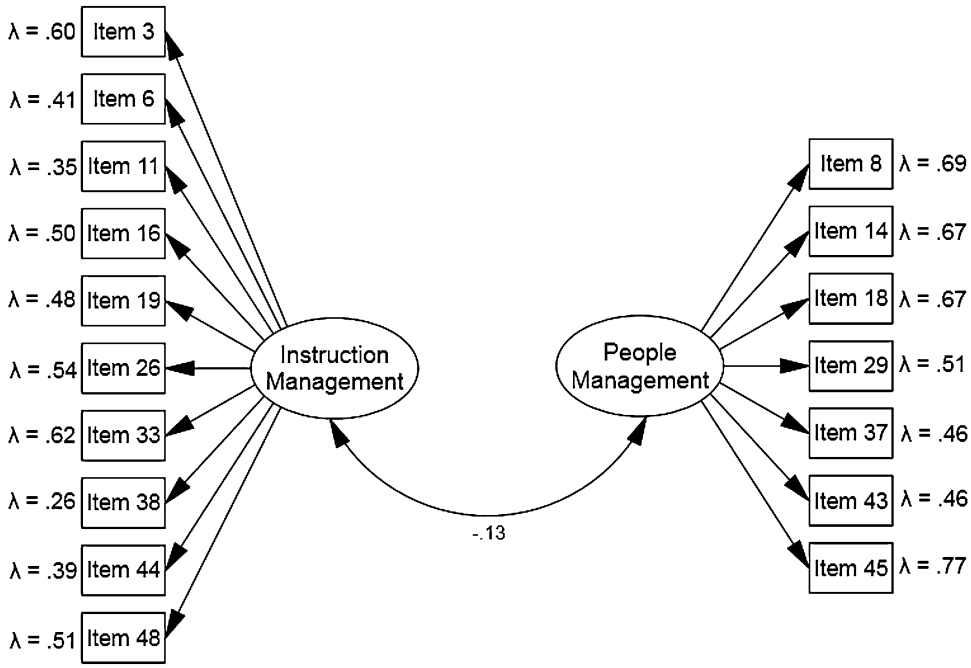

Fig. 1 The measurement model and factor loadings on IM and PM

Multigroup Invariance Test

To verify whether the ABCC-A inventory is equivalent across different teacher samples, two invariance tests were conducted. First, a comparison was made between 163 first-career teachers and 87 s-career teachers. The invariance between the two groups can be indicated by a non-significant difference in the χ^2 values ($\Delta\chi^2$) or a difference in the CFI values (ΔCFI) smaller than 0.01. Results showed that the invariance is supported when the factor loadings were constrained to be equal across groups: $\Delta\chi^2 = 16.58$ ($df = 15$), $p > 0.05$; $\Delta\text{CFI} = 0.002$. This suggests that the revised ABCC inventory is operating equivalently between the first-career teachers and second-career teachers. Second, another comparison was made between 84 lower grade teachers (primary school) and 169 higher grade teachers (secondary school). The invariance was also supported when the factor loadings were constrained to be equal across groups: $\Delta\chi^2 = 9.23$ ($\Delta df = 15$), $p > 0.05$; $\Delta\text{CFI} = 0.008$. Such result suggests that the revised ABCC inventory is operating equivalently among primary and secondary school teachers.

Study 3

Data Analytic Plan

In the study 3, the convergent and discriminate validity tests for the IM and PM dimensions of ABCC-A were conducted with the second-phase teacher sample ($N_3 = 41$) to confirm the validity of the revised ABCC-A. These teachers' responses for IM and PM scales of ABCC-A, PTE, and positive teacher–student interaction (QTI-positive) were also used.

Results

Convergent and Discriminate Validity

The convergent and discriminate validity were tested by conducting the correlations of IM and PM with PTE and positive teacher interaction. Results are summarized in Table 3. First, as was hypothesized, IM is positively correlated with PTE ($r = 0.35$, $p < 0.05$). The reversed PM scores are negatively and significantly correlated with PTE scores ($r = -0.39$, $p < 0.05$), suggesting a positive link between the use of PM and PTE. Basically, teachers who use more IM and PM may believe that they are able to bring positive outcomes to their students.

Second, as was hypothesized, reversed PM scores negatively correlate to positive teacher–student interaction ($r = -0.39$, $p < 0.05$), suggesting a positive link between the use of PM and positive student–teacher interaction. Meanwhile, IM does not correlate with positive student–teacher interaction ($r = -0.08$, $p > 0.05$). In other words, PM may involve the use of positive teacher–student interaction styles, such as understanding students' feelings and giving freedom to the students' own decision-making, while IM does not necessarily involve the use of these interaction styles with students.

Table 3 Correlations between subscales of ABCC and PTE and correlations between subscales of ABCC and positive teacher interaction

	IM	PM
PTE	0.35*	−0.39*
Positive teacher interaction (QTI-positive)	−0.08	−0.39*

* $p < 0.05$

Discussion

This study validated the beginning teachers' ABCC-A for use in Singapore context by conducting three studies. First of all, in order to optimize the psychometric properties of the selected ABCC items, we conducted a preliminary screening by comparing the theorized ABCC item classification with that of two reduced versions of ABCC inventory. Only items that were consistently classified among the three ABCC versions were selected for our current analysis. This step constitutes one of the unique features of this study in that despite numerous validation studies of ABCC inventory (Martin et al. 1998, 2007; Savran and Cakiroglu 2003), few studies, however, have examined and ensured the consistency of their revised ABCC inventories. The absence of such a step would arguably ravage the item stability.

In study 1, the behavior management dimension of ABCC inventory was first examined, as it was usually found to have poor psychometric properties. Whether to delete this dimension or combine it with the PM dimension was determined in this study by comparing the reliabilities of these two solutions. Similar with Martin et al. (2007) results, our results support the deletion of behavior management dimension in that the deletion generates a higher internal consistency of the dimension (Cronbach's alpha was 0.76 for the original PM dimension; Cronbach's alpha was 0.64 for the combined dimension of behavior management and PM). After the above initial screenings, we performed exploratory factor analyses to the remaining items. Six items with low factor loadings were deleted. Ten items and seven items were, respectively, loaded to the instruction and PM dimensions. Factor loading results for the 17 retained items are consistent with the hypothesized dimensionality. The 10 retained items of IM and 7 items of PM showed acceptable internal consistency (0.71 and 0.82, respectively).

In study 2, CFA was conducted for the selected items of instruction and PM dimensions. The good model fit obtained suggests that the two-factor structure of ABCC-A inventory is acceptable. Meanwhile, it was tested whether the obtained ABCC-A inventory operates equivalently across different teacher samples. Results suggest that the ABCC-A inventory is equally applied to first-career and second-career teachers, and primary school and secondary school teachers.

In study 3, convergent and discriminate validity was examined utilizing PTE data and positive teacher–student interaction data. As was hypothesized, both instruction and PMs correlate positively to PTE. This suggests that teachers who have high control in instruction and PMs may have more confidence in their abilities in bringing out positive outcomes from students. Meanwhile, positive correlation was found between teachers' PM and positive teacher–student interaction, but no association was found between teachers' IM and positive teacher–student interaction. This result, in our opinion, is in line with the definition of PM in that teachers (who prefer to use PM are care oriented, so they are more likely to adapt positive teacher–student interaction styles, such as giving students freedom to make decisions). However, teachers who prefer to use more IM are control oriented, and this type of management is less likely to be related to positive interaction styles. Teachers' classroom management styles were rarely linked up with teacher–student interaction styles in previous literature. The current study provides a deeper exploration on the difference between IM and PM. In sum, by following a comparatively stringent construct validation procedure, this ABCC-A inventory obtained good psychometric properties including reliability and validity. Its structure is stable across different teacher samples in Singapore.

Conclusion

The validation of ABCC inventory in different cultural contexts is warranted in this study to clarify the classroom management construct for use in Singapore schools. The validated ABCC inventory-ABCC-A were presented. The CFA of ABCC-A revealed a good model fit of IM and PM subscales and evidence of invariance among different groups of beginning teachers (first-career versus second-career teachers; primary versus secondary school teachers) in Singapore schools. The results indicated that the original behavior management subscale was not appropriate to be part of ABCC-A inventory. This had further supported the previous research findings that challenge the three-factor solution (Henson 2003; Martin and Sass 2010; Savran and Cakiroglu 2003). Moreover, evidence of convergent and discriminate validity was obtained with personal teaching efficacy scale and QTI-positive scales. In short, the revised 17-item ABCC-A inventory has adequate psychometric properties and is a reasonably short and appropriate instrument to measure Singapore teachers' attitudes and beliefs on classroom management. There are several limitations faced in this study. First, since the data are only

collected among 512 Singapore beginning teachers, beginning teachers who involved may be qualitatively different from the population at large, and thus the results obtained may be sample, context, and culture specific. Future research is therefore desired to replicate the results among larger samples and diverse cultural contexts such as Malaysia, Hong Kong, and China. Longitudinal studies could be conducted on using ABCC inventory to examine the teachers' and students' perceptions of classroom control approaches across different classrooms and durations may also be considered. Second, given the gender, subject, and grade level variables of the sampled beginning teachers were not controlled, and thus whether the factor structure would remain invariant across groups remains unknown and this could pose further questions for future studies. Third, since the revised ABCC-A is a self-report instrument that intended to measure teachers' classroom control approaches, thus, concurrent validity based on other sources of observational data would be needed to verify this self-report instrument. Despite these limitations, the results of this study have implication for the improvement of both beginning teachers' classroom management practices and teacher education programs. Beginning teachers can consider using the revised ABCC Inventory as a self-reflective tool to monitor and reflect on their classroom management approaches periodically. The results of this study are thus useful in enabling teacher educators better understand the beginning teachers' classroom management practices which in turn may lead to the improvement of teacher education programs and quality professional development experiences for the beginning teachers

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