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Predicting teachers' intentions to implement school-based assessment using the theory of planned behaviour

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The theory of planned behaviour (TPB) was used to explore the Hong Kong teachers' intentions to implement school-based assessment (SBA) and the predictors of those intentions. A total of 280 teachers from Hong Kong secondary schools who had been involved in SBA were surveyed. Rasch-calibrated teacher measures were calculated for each of the 6 variables – affective and instrumental attitude, subjective norm, self-efficacy, knowledge, and intention – regarding SBA. The results of hierarchical multiple regression analysis revealed that instrumental attitude and self-efficacy made significant contributions to predicting intentions to implement SBA. These 2 predictors explained 55.2% of the variance in intentions. The other 3 variables, that is, affective attitude, subject norm, and knowledge, did not have significant predictive power on the formation of intentions to implement SBA. Possible explanations and implications of the findings are discussed.

Keywords: school-based assessment; theory of planned behaviour; Rasch measurement; teachers

Introduction

In 2005, the Hong Kong government announced that a new academic system was to be implemented beginning in 2009. All students would be expected to complete 3 years of junior secondary education followed by 3 years of senior secondary education and then take a single public examination – the Hong Kong Diploma of Secondary Education (HKDSE) Examination. School-based assessment (SBA) accounting for a substantial part of the final grade – varying from 15% to 50% – was incorporated into HKDSE for most subjects. SBA would be administered in schools, and students' performances would be marked by their own teachers. As a response to the criticism of the “one-shot” external summative examination, SBA is often promoted as placing more emphasis on formative assessment to enhance teaching and learning (G. T. L. Brown, Hui, Yu, & Kennedy, 2011). Since schools are given more flexibility to cater for students' learning needs in designing and conducting SBA, students' capacity for self-evaluation and lifelong learning could be promoted (Davison, 2007). In Hong Kong, the major reasons for incorporating SBA into the HKDSE included (a) enhancing the reliability of assessment by having students' performances assessed by their own teachers, (b) providing a more valid and

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holistic assessment which covers learning areas that are difficult to assess by public examinations, and (c) promoting a positive “backwash effect” on learning and teaching.

SBA is expected to satisfy dual purposes – formative and summative – of assessment at the same time. On the one hand, SBA is designed as a low-stakes formative assessment which provides students with continuous feedback for enhancing their learning. On the other hand, SBA is required to provide summative evidence of students’ learning outcomes and, therefore, becomes a high-stakes assessment since it will account for some parts of the final grade. For an educational system like Hong Kong, well-known as being examination oriented, SBA is by no means a small change. It calls for a major assessment reform that embraces significant changes in school culture and structures as well as in teachers’ role and instruction (Davison, 2007). Part of the high-stakes assessment responsibilities are shifted from external examinations and authorities to classroom teachers, and this is likely to be a huge challenge to teachers. This issue was emphasised by previous scholars (e.g., Berry, 2008, p. 37) by arguing that teachers’ readiness and beliefs are of paramount importance in the implementation of SBA.

The history of SBA in Hong Kong might be traced back to the 1970s. The teacher assessment scheme (TAS), a form of SBA, was incorporated into the Hong Kong Advanced Level Examination (HKALE) for the Chemistry subject in 1978 and has been extended into various subjects in the following few decades. The Hong Kong Certificate of Education Examination (HKCEE) also included a component of SBA for many subjects since 1980. Despite the long history of SBA in Hong Kong, studies exploring teachers’ views on SBA in HKALE or HKCEE (e.g., Cheung & Yip, 2004; Davison, 2007; Lam & Chan, 2010; Yip & Cheung, 2005) showed that teachers had many concerns about the implementation of SBA in terms of resources, workloads, and training. Not all were convinced regarding the reliability and validity of SBA.

As a response to awareness of the challenges faced by teachers, the Hong Kong Education Bureau devotes considerable resources to help them in the implementation of SBA for the HKDSE. Support measures include professional development programmes, seminars, supporting materials (e.g., handbooks, booklets, sample assessment tasks, and other exemplars). However, in spite of this extensive commitment of time and money, little is known of the teachers’ understanding, in particular teachers’ conceptions and intentions regarding SBA as well as the relationships among these variables. The above-mentioned studies on SBA in Hong Kong were, in the main, descriptions of teachers’ concerns related to SBA. As far as this author knows, no attempt has been made to build a structural understanding of teachers’ intentions and their conceptions which have influences on those intentions. This vacuity in literature might leave the implementation of SBA in a risky situation since, as G. T. L. Brown (2004) pointed out, simply introducing an assessment innovation without addressing teachers’ conceptions might not necessarily achieve the intended objectives. This point was echoed by Hallinger (2010), who argued that successful educational reform relies on teachers’ conceptions, participation, and support for change. The present study attempts to fill this gap in the literature using the theoretical framework of the theory of planned behaviour (TPB; Ajzen, 1985, 1991).

TPB has been widely applied to interpret conception, intention, and behaviour in educational settings in Western settings (Campbell, 2010; Davis, Johnson, Cribbs, & Saunders, 2002; Ingram, Cope, Harju, & Wuensch, 2000) as well as in the Hong Kong context (Yan & Sin, 2013). TPB outlines relationships among attitude toward behaviour, subjective norm, perceived behavioural control, intention, and behaviour. Attitude toward behaviour refers to the individual’s overall evaluation of performing the behaviour in question, and that overall evaluation often contains two separate components: affective and instrumental attitude

(Ajzen, 1991, 2002; Trafimow et al., 2004). The affective attitude incorporates feelings or emotions arising from the prospect of performing the behaviour; while instrumental attitude refers to an appraisal of how advantageous would be the consequences of performing the behaviour (Breckler & Wiggins, 1989). Subjective norm refers to perceived social pressure to perform, or not perform, the behaviour and is usually defined as an individual's perception of whether important others think the behaviour should be performed. Perceived behavioural control refers to one's perception of the ease or difficulty of performing the behaviour (Ajzen, 1991, 2002). Self-efficacy is a widely used indicator of perceived behaviour control. Some studies (e.g., Kuyini & Desai, 2007) included knowledge about the behaviour as a component of perceived behaviour control since the sufficiency of knowledge has potential impacts on the perception of the ease of performing the behaviour. According to TPB, behavioural intention is a function of attitude toward the behaviour, subjective norm, and perceived behavioural control. Behavioural intention, together with perceived behavioural control can predict the behaviour (Ajzen, 1991). Generally speaking, those who have a favourable attitude, a positive subjective norm, and a high level of perceived behaviour control will be more likely to have the intention to perform the behaviour. The higher the levels of intention and perceived behavioural control are, the more likely the behaviour will be demonstrated.

Research question

The purpose of this study was to fill the above-mentioned gap in the literature by exploring the contribution of Hong Kong teachers' conceptions to their intentions regarding SBA using the theoretical framework of TPB. In particular, the investigation was conducted on teachers' (affective and instrumental) attitude, subjective norm (i.e., perceived significant others' opinions), perceived behavioural control (i.e., self-efficacy and knowledge), and intention regarding the implementation of SBA. The behaviour component of TPB was omitted from the present study since SBA is a mandatory policy in Hong Kong schools: Implementing SBA or not is out of teachers' volitional control. In other words, teachers have to carry out SBA even if they hold quite low levels of intention and perceived behaviour control. It is, therefore, inappropriate to study the behaviour component based on the framework of TPB in this case. Although most of the studies employing TPB were conducted in voluntary settings, a few studies have found that TPB was useful in investigating human behaviour in mandatory settings (e.g., S. A. Brown, Massey, Montoya-Weiss, & Burkman, 2002; Norten, 2011; Rawstorne, Jayasuriya, & Caputi, 1998, 2000). In a study on the acceptance of new technology, S. A. Brown et al. (2002) noted that performers' beliefs and attitudes toward a behaviour were of high importance in a mandatory-use environment since performers "can delay or obstruct the implementation, and resent, underutilize or sabotage the new system" (p. 284) if they hold a negative attitude. Norten (2011) also reported that TPB offered a sound framework to understand fully an individual's behavioural intention in a mandatory setting. In the current study, although the intention-behaviour relationship is reduced, as SBA is a mandatory policy in Hong Kong schools, teachers' intentions to implement SBA and factors that may have influence on such intentions remain unclear. This field warrants consideration given the important role teachers are playing in SBA. Excluding the behaviour component, the main research question for the present study was formulated as follows: *Can teachers' intentions to implement SBA be predicted by teachers' affective and instrumental attitude, subjective norm, self-efficacy, and knowledge regarding SBA?*

Method

Sample

A stratified sampling technique (Newman, 1999) with school bands¹ as the strata was used for selecting participating schools in this study. Since students' academic abilities are believed to have an impact on the implementation of SBA (Yan, *in press*), school bands, as a general indicator of students' academic abilities, was used as the criterion for selecting participating schools. Ten secondary schools representing different bands (3 Band 1, 3 Band 2, and 4 Band 3) were recruited. All teachers in the selected schools were invited to participate in the survey. A total of 673 questionnaires were distributed in the 10 schools, and 504 (74.9%) were completed and returned. Among the respondents, 280 (55.6%) reported that they had been involved in the implementation of SBA, while 224 (44.4%) were not involved in SBA. The reason is that SBA is normally implemented in Forms 5 and 6, and teachers teaching Forms 1 to 4 are not required to conduct SBA. The current study focussed on the 280 teachers with SBA experiences since the purpose was to investigate teachers' conceptions and intentions regarding SBA based on their first-hand experiences. The dataset for the current study comprises 70 (25.0%) teachers from Band 1 schools, 91 (32.5%) teachers from Band 2 schools, and 119 (42.5%) teachers from Band 3 schools. There are 100 (35.7%) males, 179 (63.9%) females, and only 1 (0.4%) without such information.

Instruments

Four components in the TPB framework were investigated in the present study: attitude (affective and instrumental attitude toward SBA), subjective norm (perceptions of the important others' opinions about SBA), perceived behaviour control (self-efficacy and knowledge on SBA), and intention (intention to implement SBA). Six scales were developed to access these variables. The procedure suggested by DeVellis (2012) was adopted for the scale development. First, a construct map illustrating the operational definitions of variables as well as the relationships among them was developed based on the TPB framework. Second, the items were developed by adopting the principles for TPB scale construction suggested by Ajzen (2002). Previous literature, government documents on SBA, and consultative discussions with relevant experts and teachers contributed to the item crafting. At last, the initial item pool was subject to review by the research team and experts. The relevance of items, ambiguities and anomalies in item wording, and possible bias were checked, and necessary changes were made to the items in each of the scales. All items have a 6-point Likert-type response scale with available response options ranging from *Strongly Disagree* (1), through *Disagree* (2), *Slightly Disagree* (3), *Slightly Agree* (4), *Agree* (5), to *Strongly Agree* (6). Two items in the instrumental attitude scale are negatively worded to minimise the tendency, which is called "acquiescence bias" by Cronbach (1942), in respondents to simply agree with the scale items regardless of the item content. The scores on these two items were reversed before the data analysis so that the scores could be interpreted in the same direction, that is, a higher score represents a higher level on the latent trait under investigation.

The affective attitude scale (AAT), tapping teachers' feelings or emotions arisen by the prospect of conducting SBA, contains 5 items (e.g., AAT2: SBA is an enjoyable process). The instrumental attitude scale (IAT), which consists of 17 items (e.g., IAT2: SBA helps students to understand their strengths and weaknesses through feedback from teachers), is used to assess teachers' appraisal of how advantageous would be the consequences of

implementing SBA. Five items (e.g., SNS2: As far as I know, the principal of my school agrees that SBA should be implemented) are included in the subjective norm scale (SNS) to examine teachers' perceptions of important others' opinions regarding SBA. Teachers' self-efficacy in implementing SBA is investigated by a scale (SEF) comprising 9 items (e.g., SEF6: I can design appropriate assessment tasks for SBA). Seven items in the knowledge scale (KNO), including "KNO3: I am familiar with the implementation guidelines of SBA" are used to examine teachers' knowledge related to SBA. Teachers' intentions to implement SBA are assessed by a 6-item scale (INT). A sample item is "INT4: I am willing to adjust the assessment methods to meet the SBA requirements".

Data analysis

Rasch analysis (Rasch, 1960) using Winsteps 3.7 (Linacre, 2011) was used to examine the psychometric properties of the developed scales and to calculate teachers' measures on each of the latent traits. Rasch analysis, instead of traditional analysis based on classical test theory, was used because of its advantages in dealing with ordinal data collected through Likert-type response scales. Ordinal data indicate ordering only but not any proportional levels of meaning and, therefore, are not appropriate for traditional analyses which require linear, interval scale data input (Wright, 1997). Rasch analysis can transform ordinal raw data into interval logit scale measures, which have constant interval meaning and provide objective and linear measurement (Bond & Fox, 2007; Linacre, 2006). Teachers' measures on the six latent traits, which are interval measures, were then subject to traditional analysis, such as *t* test, analysis of variance (ANOVA), and hierarchical multiple regression, to describe teachers' attitude, subjective norm, perceived behaviour control, and intention regarding SBA as well as to investigate the relationships among these variables in the Hong Kong context.

Results

This section presents results from three perspectives. Rasch analysis was first utilised to examine the psychometric properties of the developed scales so as to ensure they are psychometrically robust for use with the sample in the current study. Second, teachers' measures on the six scales were calibrated so that descriptive analyses on teachers' attitude, subjective norm, perceived behaviour control, and intention regarding SBA can be provided. Third, to address the main research question of the current study, hierarchical multiple regression analysis was employed to investigate which variables contribute to teachers' intentions to implement SBA.

The psychometric properties of the six scales

The psychometric properties of the six scales used with the current sample were examined from a Rasch measurement perspective. Item fit statistics, including infit and outfit mean squares (MNSQ), were used to check the extent to which the data match the measurement specifications of the Rasch model. Rasch person/item reliability and the amount of variance explained by measures were used as indications of the scale quality. As Wright, Linacre, Gustafson, and Martin-Löf (1994) pointed out, there are no hard-and-fast rules regarding acceptable ranges for item MNSQ fit statistics. Previous studies have selected different acceptable ranges for indicating good model data fit. Some researchers (e.g., Linacre, 2006; Yan & Coniam, 2013) regarded the range of 0.5 to 1.5 as indicative of productive

Table 1. Psychometric properties of scales for measuring components of TPB.

Scale	Number of items		Rasch Person Reliability	Rasch Item Reliability	Variance explained by measures
	Original scale	Final scale			
AAT	5	5	0.90	0.99	71.0%
IAT	17	14	0.95	0.99	63.7%
SNS	5	4	0.85	0.99	66.9%
SEF	9	8	0.90	0.98	58.8%
KNO	7	4	0.89	0.98	74.5%
INT	6	5	0.92	0.88	75.5%

measurement, while Wright et al. (1994) suggested that a range of 0.6 to 1.4 could be more reasonable for survey data with rating scales. In this study, therefore, the more demanding range of 0.6 to 1.4 was adopted as the cut-off value of MNSQ fit statistics, and items with values out of this range were regarded as misfitting to the Rasch model. Table 1 summarises the psychometric properties of the six scales used in the current study.

Three items in the original IAT scale showed misfit to the Rasch model with MNSQ values outside the acceptable range. These items are IAT3 (SBA increases my workload), IAT8 (SBA increases academic burdens on students), and IAT13 (SBA can improve the quality of teaching and learning). IAT3 and IAT 8 are negatively worded items. It seems that these items functioned differently from other items in the IAT scale, and, therefore, they were removed from the scale. Based on the same reasoning, one misfitting item (SNS1: As far as I know, officials of the Education Bureau agree that SBA should be implemented) was excluded from the final version of the SNS scale. Officials of the Education Bureau are no doubt important stakeholders in terms of policy-making and promotion with regard to SBA, but the impact of those officials seems different from the social pressure imposed on teachers by other stakeholders, such as principals, parents, students, and fellow teachers. Item SEF2 (I have enough time to implement SBA) was dropped from the SEF scale. Since self-efficacy is commonly defined as the belief in one's capacity to produce given attainments (Bandura, 1997, p. 3), all items in the SEF scale except SEF2 (about "time") are about some aspects of teachers' capacity in implementing SBA, such as "I can explain to students the SBA requirements" and "I can design appropriate assessment tasks for SBA". However, whether the teacher has enough time for SBA, as stated in SEF2, seems not to be a capacity issue in that sense. This item is, therefore, more likely to indicate a dimension other than self-efficacy for implementing SBA. Three items in the KNO scale including KNO1 (I understand the purpose of incorporating SBA into the HKDSE), KNO5 (I am familiar with the moderation of SBA scores), and KNO7 (I am familiar with the support provided by the EDB for SBA) were also identified as misfitting the Rasch model. A likely explanation is that the material addressed in most of the items in the KNO scale, such as requirements, guidelines, assessment criteria, and administration procedure, is directly related to teachers' implementation of SBA. Teachers regard them as prerequisites to carrying out SBA. However, the knowledge referred to in the misfitting items is not so relevant to teachers' action of SBA in their perception. Teachers can carry out SBA even with limited knowledge on those aspects. The INT scale had one misfitting item (INT6: I am willing to encourage students to participate in SBA), which was finally excluded. Given that the intention assessed by other items in the INT scale targeted at teachers'

actions in SBA, this item probably made itself different from others by involving students as the target of the intention.

After excluding the misfitting items, the final versions of the six scales demonstrated satisfactory psychometrical properties (see Table 1). Rasch person reliabilities ranged from 0.85 to 0.92, and item reliabilities ranged from 0.88 to 0.99. The reliability coefficients are quite satisfactory even though some scales are short (e.g., SNS and KNO). Quite a high proportion of variance in the observed data (58.8% to 75.5%) was explained by the Rasch measures, suggesting that the Rasch model provides good predictions of item and person performance for the six scales. In summary, the good psychometric properties of the six scales support their use with the sample in the current study.

Descriptive analysis

Before moving to the major issue of the current study – exploring the contribution of teachers' conceptions to their intentions regarding SBA – it is meaningful to look at teachers' responses to the six scales as a whole, that is, the picture of teachers' attitude, subject norm, perceived behaviour control, and intention regarding SBA. As discussed above, ordinal data collected via Likert-type scales could be transformed into interval measures by Rasch analysis. Teachers' Rasch-calibrated measures on the six scales are, therefore, appropriately subjected to traditional inferential statistics; *t* tests and ANOVAs were employed respectively to investigate whether there are gender and school banding differences in teachers' responses to the six scales. Table 2 presents the results of comparisons.

Rasch analysis sets the mean difficulty of all items at zero, which is also the scale origin. Therefore, person measures higher than zero indicate more positive responses than the average, while person measures lower than zero indicate more negative responses. It can be seen from Table 2 that, overall, teachers had a considerably negative affective attitude toward SBA ($M = -2.43$, $SD = 2.69$) indicating that negative feelings or emotions would arise from the prospect of conducting SBA. The mean person measures on IAT ($M = -0.65$, $SD = 1.81$) and SNS ($M = -0.63$, $SD = 1.99$) are only marginally lower than zero. That means teachers held from slightly negative to neutral instrumental attitudes toward SBA, and, in their perceptions, the important others' (e.g., principals, parents, students, and fellow teachers) views on SBA were slightly negative although close to neutral. Teachers had mean person measures higher than zero on scales SEF ($M = +1.58$, $SD = 2.09$), KNO ($M = +5.17$, $SD = 4.11$), and INT ($M = +2.02$, $SD = 4.64$). These results suggest that teachers claimed higher levels of self-efficacy on implementing SBA; they saw themselves as quite knowledgeable on SBA and also as having high levels of intention to carry out SBA. The large standard deviations associated with teachers' measures on KNO and INT scales implied that there are considerable individual differences amongst these teachers.

To further investigate individual differences among teachers, *t* tests and ANOVAs were undertaken to gauge the effects of gender and school banding on teachers' responses. The *t*-test results revealed that gender did not have a significant impact on teachers' responses to the six scales except KNO, where males demonstrated higher ($p < .05$) performance than females, indicating that male teachers perceived themselves more knowledgeable than did the female teachers. The results of ANOVA showed that the main effect of school banding was not significant for all six scales; post-hoc comparisons with Fisher's least significant difference (LSD) procedure also indicated that no statistically significant difference emerged.

Table 2. Comparisons of mean person measures (in logits) on six scales.

	AAT	IAT	SNS	SEF	KNO	INT
Overall ($N = 280$)	-2.43	-0.65	-0.63	+1.58	+5.17	+2.02
<i>Gender</i>						
Male ($N = 100$)	-2.47	-0.61	-0.65	+1.78	+5.80	+2.07
Female ($N = 179$)	-2.39	-0.67	-0.62	+1.48	+4.78	+2.01
<i>t</i> -test results	$t = -0.232, df = 277,$ $p = .817$	$t = 0.263, df = 277,$ $p = .793$	$t = -0.098, df = 277,$ $p = .922$	$t = 1.126, df = 277,$ $p = .261$	$t = 1.987, df = 277,$ $p = .048^*$	$t = 0.105, df = 277,$ $p = .916$
<i>School Banding</i>						
Band 1 ($N = 70$)	-2.72	-0.88	-0.70	+1.74	+5.99	+1.21
Band 2 ($N = 91$)	-2.24	-0.72	-0.90	+1.42	+4.89	+2.28
Band 3 ($N = 119$)	-2.40	-0.47	-0.39	+1.61	+4.91	+2.30
ANOVA results	$F(2, 277) = 0.646,$ $p = .525$	$F(2, 277) = 1.189,$ $p = .306$	$F(2, 277) = 1.729,$ $p = .179$	$F(2, 277) = 0.483,$ $p = .618$	$F(2, 277) = 1.832,$ $p = .162$	$F(2, 277) = 1.431,$ $p = .241$

* $p < .05$.

Table 3. The correlations among TPB variables predicting teachers' intentions to implement SBA.

	AAT	IAT	SNS	SEF	KNO
IAT	.892**				
SNS	.651**	.638**			
SEF	.253**	.335**	.258**		
KNO	.171**	.230**	.180**	.610**	
INT	.575**	.642**	.477**	.571**	.342**

** $p < .01$

Regression

The main research question – whether teachers' intentions to implement SBA can be predicted by teachers' affective and instrumental attitude, subjective norm, self-efficacy, and knowledge regarding SBA – was examined by employing hierarchical multiple regression analyses.

Before the regressions were conducted, the correlations among the predictors were examined, and the risk of multicollinearity was evaluated. According to Field (2009), correlations between predictors above 0.8 could be regarded as a signal of multicollinearity. As can be seen from Table 3, all the correlations among the predictors were significant, but only the correlation between AAT and IAT is higher than .8. The further multicollinearity statistics showed that the variance inflation factors for the predictors (around 1.0) were much smaller than 10, indicating that the risk of multicollinearity could be disregarded in the use of multiple regression in this case according to Menard's (1995) suggestion. The assumption of linearity of multiple regression was also checked. Multiple regression assumes linearity, and a curvilinear relationship between dependent and independent variables may result in an underestimation of the true relationship in the regression analysis (Osborne & Waters, 2002). The residual plots (plots of the standardised residuals as a function of standardised predicted values) were examined, and the results indicated linear relationships between dependent and independent variables in this case.

The main research question was addressed by conducting hierarchical multiple regression analysis. Theoretically, the relationship between perceived behavioural control and intention is independent of attitudes and subjective norms (Jemmott, Jemmott, Hines, & Fong, 2001). Therefore, the independent variables were organised into two blocks of predictors in order to examine the unique contribution of each block of predictors to the dependent variable (the intention). Teachers' intentions to implement SBA were regressed onto the first block of predictors (i.e., instrumental and affective attitudes, and subjective norm) in Step 1; and the second block of predictors (i.e., self-efficacy and knowledge) in Step 2. Table 4 presents the summary of the hierarchical multiple regression analysis.

The results revealed that, in Step 1, the model accounted for 41.3% of the variance in teachers' intentions to implement SBA with IAT ($\beta = .596, p < .01$) as the significant predictor of the intention. In Step 2, where the second block of predictors entered, additional

Table 4. Summary of multiple regression analysis for TPB variables predicting teachers' intentions to implement SBA.

Predictors	Regression coefficients			Model summary			
	β	B	SE	R	R ²	Adjust R ²	R ² Change
Step 1				.648	.420	.413	.420**
AAT	-.032	-.056	.180				
IAT	.596**	1.524	.263				
SNS	.118	.274	.143				
Step 2				.748	.560	.552	.140**
AAT	.075	.129	.159				
IAT	.394**	1.010	.237				
SNS	.074	.171	.125				
SEF	.418**	.927	.116				
KNO	-.030	-.033	.057				

** $p < .01$.

contributions were added, and the adjusted R^2 increased to .552, suggesting that the model accounted for 55.2% of the variance in teachers' intentions to implement SBA. SEF ($\beta = .418$, $p < .01$) was identified as another significant predictor of the intention. In the final model, two of the five predictors, IAT and SEF, have a significant contribution to the intention. The other three predictors, AAT, SNS, and KNO, do not have significant predictive power on the formation of the intention. The regression coefficients also showed that the contribution of SEF ($\beta = .418$) was slightly larger than that of IAT ($\beta = .394$).

Discussion

The current study aims to explore the contribution of teachers' conceptions – affective and instrumental attitude, subjective norm, self-efficacy, and knowledge – to their intentions regarding SBA using the theoretical framework of TPB.

To achieve the research goal, six scales were developed to assess teachers' affective and instrumental attitude (attitude component), perceived important others' opinions (subjective norm component), self-efficacy and knowledge (perceived behaviour control component), and intention (intention component) with regard to SBA. The psychometric properties of the six scales were examined from a Rasch measurement perspective. After removing misfitting items, the final versions of the scales were shown to be psychometrically robust for use with the sample in the current study.

Descriptive analyses on TPB components

The descriptive analysis on the Rasch-calibrated teacher measures indicated that teachers had considerably negative affective attitudes toward SBA, indicating negative feelings arisen by the prospect of conducting SBA. In particular, teachers did not regard SBA as an interesting or enjoyable process. Further, they did not agree that SBA can make the teaching an easier job. This is not a surprising finding and is in line with conclusions from previous studies (Cheung & Yip, 2004; Davison, 2007; Yip & Cheung, 2005). Although SBA is supposed to be an integral part of teaching and learning, many teachers seem to regard it as an extra burden. As Yip and Cheung (2005) reported, the major concerns of Hong Kong teachers about SBA included the lack of resource materials and training and the heavy workload caused by SBA. The results also showed that teachers held a slightly negative instrumental attitude toward SBA, suggesting that teachers' appraisals of the consequences of implementing SBA were slightly negative. A further investigation revealed that teachers had the lowest score on the items "SBA can relieve students of examination pressure" and "SBA helps students to perform better in public examinations". These results reflected that, at least in teachers' perceptions, two of the major purposes of SBA – relieving students' examination pressure and providing positive "backwash" effect on learning – were not accomplished. This finding echoes G. T. L. Brown's (2004) warning that an assessment reform without addressing teachers' concerns might fail to achieve the intended outcomes. A slightly negative subjective norm was observed for teachers, indicating that, in teachers' perceptions, the important stakeholders (i.e., principals, parents, students, and teachers) do not have a high level of acceptance of SBA. A further examination found that students and teachers who are directly involved in the implementation of SBA have the most negative view on SBA. Teachers demonstrated a high level of self-efficacy on implementing SBA, indicating that teachers perceived themselves as capable of carrying out SBA. Teachers also had a high mean measure on the KNO scale suggesting that they perceived themselves quite knowledgeable with regard to SBA.

Teachers demonstrated positive intentions towards SBA, indicating that, in general, teachers were willing to implement SBA.

It was found that teachers' responses to the six scales did not differ with regard to school banding. Although students' academic abilities are believed to have an impact on the implementation of SBA (Yan, *in press*), its influence on teachers' conceptions and intentions regarding SBA was not apparent in the current investigation. However, this result may not be conclusive since school banding is only a general indicator, but not a direct measure, of academic ability. Gender did not have a significant impact on teachers' responses on the six scales except that males reported higher ($p < .05$) self-perception than did females in terms of knowledge related to SBA.

Predictors of teachers' intentions to implement SBA

The major focus of the current study was to explore the contribution of teachers' conceptions (i.e., affective attitude, instrumental attitude, subjective norm, self-efficacy, and knowledge) to their intentions regarding SBA using the theoretical framework of TPB. The results of hierarchical multiple regression showed that two variables, instrumental attitude and self-efficacy, were significant predictors of the intention. Teachers who have a favourable instrumental attitude – perceiving the consequence of SBA to be positive – and a high level of self-efficacy are more likely to have the intention to implement SBA. Self-efficacy had a slightly stronger effect on predicting the intention than did instrumental attitude. The other three variables, affective attitude, subject norm, and knowledge, did not have significant predictive power on the formation of the SBA intention. This finding might be interpreted according to expectancy-value theory (Wigfield & Eccles, 1992), which argues that individuals' choice or behaviour is an outcome of the interaction between their beliefs about the probabilities of success on the behaviour and the subjective values they attach to the behaviour. In this case, self-efficacy, as an indication of perceived ability, reflected teachers' expectation of the probabilities of success on implementing SBA; while instrument attitude, which is related to teachers' evaluation on the consequences of SBA, reflected the values teachers attributed to SBA.

The finding that instrumental attitude was more predictive than affective attitude in predicting intention is different from some available studies where affective attitude showed stronger influence than did instrumental attitude on the intention to some behaviour, such as exercise (e.g., Courneya, Vallance, Jones, & Reiman, 2005; Kraft, Rise, Sutton, & Røysamb, 2005; Lowe, Eves, & Carroll, 2002; Rhodes & Courneya, 2003) and risk behaviours such as smoking and speeding while driving (Lawton, Conner, & Parker, 2007; Trafimow et al., 2004). It should be noted that the discrepancy might partially be due to the different nature of personal and working behaviour. Personal behaviours, (e.g., exercise, smoking and speeding while driving) are under an individual's volitional control. The favourable feelings or emotions associated with such behaviour obviously have a strong impact on the formation of the behavioural intention. Some behaviour with advantageous consequences might not be attractive to people if they cannot have fun from it (e.g., exercise); in contrast, some behaviour with disadvantageous, or even fatal, consequences (e.g., speeding, smoking) is still quite attractive for particular groups of people. Working behaviour, such as SBA in this case, is more instrumental in nature in terms of individual's perception. The affective feelings or emotions might not be a strong predictor for the behaviour intention since, in most cases, such work behaviour has to be conducted whether people like it or not. Thus, whether the behaviour can generate desired outcomes appears to be more influential in determining individual's motivation.

There is also another possible explanation. Lawton et al. (2007) reported that instrumental attitude had stronger predictive power on self-reported behaviour than it did for objective measures of behaviour, while affective attitude was more powerful in predicting objectively assessed behaviour than it was of self-reported behaviour. Although this result requires more empirical evidence, it points out a possibility that teachers might underestimate the impact of emotions on their behaviour when it is self-reported via questionnaires. There remains, therefore, the possibility of a different result if teachers' SBA practices were to be assessed by a more objective method (e.g., a systematic observation). This could be an interesting direction for future research. The results – that affective and instrumental attitudes played different roles in predicting the intention regarding SBA – revealed in the current study echo the suggestions of other scholars (e.g., French et al., 2005; Kraft et al., 2005) that it is important and meaningful to distinguish the affective and instrumental components of attitude in future TPB research and to identify the unique contribution of each in predicting intentions.

The results revealed that the subjective norm (important others' perceptions) was not a significant contributor to teachers' intentions to implement SBA. In a collectivist society such as Hong Kong, where individuals tend to emphasise group norms and form their value judgements based on their obligations to the group (Hofstede, 2001), one might have expected important others' perceptions have strong influences on teachers' intentions to implement SBA. This result should be interpreted, however, with appropriate caution. SBA is a quite debated issue in Hong Kong among the public as well as within the education society. There are different, even contradictory, voices regarding the effectiveness, fairness, reliability, and validity of SBA (Hong Kong Professional Teachers' Union, 2011). Such strident debates have probably confused teachers' perceptions of important others' (e.g., principal, parent, student, and fellow teacher) opinions on SBA and, therefore, reduced the predictive power of the subjective norm on their intentions to implement SBA.

The present study did not find "knowledge" (one aspect of the perceived behaviour control component) to be a significant predictor of teachers' intentions to implement SBA. The rationale for treating knowledge as one aspect of perceived behaviour control in previous studies (e.g., Kuyini & Desai, 2007) is that the more knowledge subjects have about the behaviour, the easier they perceive the behaviour, and the more motivated they are likely to be to carry out the behaviour. However, some studies (Hong Kong Professional Teachers' Union, 2011; Yan, *in press*) found that Hong Kong teachers' prior concerns regarding SBA were not knowledge based but had to do with some practical issues during implementation, such as large class sizes, huge student diversity, heavy workloads, and so forth. Knowledge is not a major determinant of the ease of behaviour, and, therefore, it does not significantly influence teachers' perceived control on SBA.

Implications for policy-making

The implications of these findings for policy-making are that if the government attempts to enhance teachers' intentions to implement SBA, some measures are necessary to nurture teachers' positive instrumental attitude toward SBA and to enhance teachers' self-efficacy in implementing SBA. Teachers' instrumental attitude toward SBA is based on their evaluation of the consequences of SBA. Positive instrumental attitude comes from recognition of the advantages of SBA, which requires both knowledge and evidence. The knowledge of advantageous consequences of SBA could be delivered to teachers through professional training. Evidence, on the other hand, is to be acquired via showcasing of genuine

examples. It reminds us that, in addition to knowledge and theory about SBA, professional training is required to provide concrete examples from which teachers can see the advantages associated with SBA and guidelines which teachers can follow.

As argued by Bandura (1997), mastery experiences have the most crucial impact on the formation of self-efficacy. Mulholland and Wallace (2001) also pointed out that successes in past behaviour build self-efficacy, while failure experiences undermine it, and such negative impact is especially detrimental if failure experiences happen before the establishment of a sense of efficacy. This issue should be given serious consideration when the Hong Kong government designs measures to support teachers' implementation of SBA. Yan (in press) reported that teachers' experiences of implementing SBA in HKDSE were far from it being a success, if not a failure. It is, therefore, necessary to help teachers achieve mastery experiences of SBA, rather than being occupied by negative experiences, to build their self-efficacy. In addition to the skills necessary to implement SBA, training programmes should provide opportunities for teachers to perform those newly acquired skills in practice. Continuous on-site support and sufficient supporting material are also necessary for teachers to have mastery experiences and to develop their SBA programmes in the required direction.

Conclusion

In conclusion, the findings of the current study indicate that TPB appears to be a useful framework in investigating teachers' intentions to implement SBA and the contributing factors to this intention. Instrumental attitude and self-efficacy are significant predictors of the intention to implement SBA. This study not only is of value in addressing academic concerns about SBA but also has implications for policy-making by providing a structural understanding of teachers' intentions to implement SBA and its predictors. In addition to SBA, there are many other educational innovations initiated in local or international contexts, and the findings of this study shed light on understanding teachers' conceptions on and responses to those changes they are expected to cope with. However, it should be noted that, given that SBA is a mandatory policy in Hong Kong, which might not be the case in other settings, the conclusions drawn here remain context bound, and any generalisation should be drawn with caution.

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Note

1. There are three "Bands" of local secondary schools in Hong Kong according to students' academic performances. Band 1 stands for a higher level of academic performance, while Band 3 stands for a lower level.

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