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School staff's perceptions of implementing the Inclusive Behavioral Support in Schools framework in Swedish schools

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ABSTRACT

The Determinants of Implementation Behavior Questionnaire for school settings (DIBQ-S) was administered to examine questionnaire internal structure evidence and ascertain 127 Swedish school staff's perceived barriers to and facilitators of implementing the Inclusive Behavioral Support in Schools program. Using confirmatory factor analysis, we tested a 3-factor model (capability, opportunity, motivation) corresponding to the Theoretical Domain Framework and the COM-B system. Measurement of motivation was suboptimal, but a 2-factor model exclusively retaining capability and opportunity had fair fit. The questionnaire showed overall fair internal structure evidence. Facilitators related primarily to motivation, whereas potential barriers related to capability, opportunity, and motivation. Teachers working in early school years perceived higher opportunity and capability than teachers working in later school years. School staff in the implementation team perceived higher opportunity than other school staff. The DIBQ-S could support school implementations by ensuring that the process feels coherent, manageable, and meaningful for frontline implementers.

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Determinants of Implementation Behavior Questionnaire; Inclusive Behavioral Support in Schools; barriers; facilitators; school; Theoretical Domains Framework; COM-B

Introduction

School-wide behavior interventions and support are useful for achieving positive behavioral, social, and academic achievement for all students (Gage et al., 2017; Simonsen & Sugai, 2019) including those at risk of behavioral challenges (Bradshaw et al., 2015). Universal and inclusive school-level approaches to learning have been found to increase academic achievements, social abilities, and overall positive attitudes to education among all children (Barton, 2015; Booth & Ainscow, 2002) as well as providing teachers with knowledge and skills to support the development of all children. When implementing evidence-based behavior support there is a need to explore the cultural and contextual conditions that hinder and enable long-term change (Nilsen & Bernhardsson, 2019; Ogden & Fixsen, 2014). The fit between intervention content and the setting will influence how the intervention is accepted, adopted and adapted. Therefore, it is important to explore the perceptions of the individuals implementing the intervention (Bourn, 2016; Smul et al., 2019). To add to the wider discussion on school staff's perceptions of intervention implementation and to provide a tool to identify these perceptions, the study uses the adapted

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questionnaire Determinants of Implementation Behavior Questionnaire for school settings (DIBQ-S) to capture the perceptions of school staff involved in the program Inclusive Behavioral Support in Schools (IBIS). The study is not evaluating IBIS' outcomes at student level, but focuses on the teachers' perceptions of the implementation as well as performing initial theoretical and statistical evaluation of the DIBQ-S.

Inclusive Behavioral Support in Schools (IBIS) program

IBIS is a school-wide universal prevention program aiming to create good teaching and learning conditions. An advantage of universal prevention is that it targets all students. This means that students with greater needs can receive effective interventions without having to be separated from the rest of the class (Landrum & Kauffman, 2006). Universal prevention is thus inclusive in nature. The program provides a system-level framework promoting prosocial behaviors and relationships, and preventing and addressing behavioral problems by influencing the work and organization of the entire school (Horner et al., 2017). IBIS is based on the Norwegian program Positive Behavior, Interactions, and Learning environment in School (PALS; Sørlie & Ogden, 2007, 2015; Sørlie et al., 2016), which, in turn, is based on the American Positive Behavioral Intervention and Supports (PBIS) program (Sugai et al., 2000). Evaluation of the IBIS program began in 2022, but the program's outcomes have not yet been published. However, many studies have been conducted on the Norwegian PALS program, the school-wide PBIS (SWPBIS) program, and similar programs. These studies have shown that the above mentioned programs effectively reduce behavioral problems (Freeman et al., 2016; Närhi et al., 2017; Sørlie & Ogden, 2007, 2015; Sørlie et al., 2018) and bullying (Waasdorp et al., 2012) in schools. Furthermore, the programs have been shown to positively affect academic achievement and classroom climate (Närhi et al., 2017; Sørlie & Ogden, 2015), increase safety in schools (Horner et al., 2009; Nelen et al., 2021), and improve attendance (Freeman et al., 2016). Finally, the programs have been shown to improve students' school performance (Beckley Yeager, 2016; Bradshaw et al., 2010; Freeman et al., 2016; Gage et al., 2017), including students' reading ability (Horner et al., 2009; Luiselli et al., 2005) and achievement in mathematics (Luiselli et al., 2005). The meta-analysis by Lee and Gage (2020) shows a statistically significant positive impact on behavioral, academic, and organizational domains. However, individual studies within the meta-analysis found null results of the SWPBIS program, indicating that significant factors have to be considered such as contextual adaptations and fidelity of implementation.

Implementation strategy of the program

During the implementation phase, each school has an IBIS team consisting of about six school staff (principal, vice principal, special needs teachers and teachers) responsible for implementing the program and for the training and supervision of school staff. Staff training and supervision take about 4 hours per month, divided into two sessions. To a similar extent, the IBIS teams receive training and supervision from an IBIS supervisor who has undergone supervisor training at Uppsala University. Supervisor training takes over five full days, lasts for just over 6 months, and corresponds to 7.5 credits (ECTS).

There are some differences between schools working under the IBIS program and schools working under "practice as usual." One difference is that IBIS schools are focused on creating a common understanding of how to create a safe, positive, and inclusive working environment for all teachers and students in the school. Another notable difference between IBIS schools and other schools is that IBIS schools work systematically in accordance with Response-To-Intervention (RTI), which means that all pupils receive research-based interventions, regardless of whether they need special support. RTI entails matching school interventions to students' needs, continuous monitoring of all

students to ensure they are developing as expected, and the use of data-driven decision-making (Grosche & Volpe, 2013).

Previous Swedish IBIS results

IBIS program implementation was studied in an interview study involving 59 participants from IBIS teams at nine schools during the initial implementation phase (Nylén et al., 2021). The study showed that IBIS team members' understanding of IBIS was facilitated by knowledge about similar evidence-based programs. They also felt that allocating sufficient time for implementing the program was essential. Several IBIS team members felt that different organizational conditions were crucial for successful implementation, as well as an available manual. Finally, IBIS team members expressed that they saw the IBIS program as having the potential to unite staff and create a shared understanding. However, a difference at the class level was found, with participating teachers from secondary schools describing more barriers to conducting IBIS than teachers at earlier levels, concerning motivation and knowledge acquisition.

Potential issues during implementation

Successful implementation of research-based programs is complex, with numerous factors to consider. There are factors affecting implementation throughout the entire process, from the planning stage to the sustainability stage (Meyers et al., 2012). These factors can be seen as having four phases: inquiring, planning, implementation, and future application. The need for change is identified in the inquiring phase, at which point the innovation is also chosen. Thereafter, readiness for change needs to be assessed regarding organizational resources and individual readiness, as well as construction of a supportive framework for the implementation process. There is also a need for the practical and philosophical fit of the implemented material (Moore et al., 2013). Practical fit considers the surrounding resources and support, whereas philosophical fit considers whether the innovation matches the practitioners' view of themselves and their responsibilities within the organization. The innovation may need to be adapted at this stage to fit the setting. Participants can be recruited and may receive training with adequate support structures and adaptations.

The inquiring phase includes factors such as organizational readiness for change and the program's contextual fit. Important factors in the planning stage include arranging an implementation support team and creating an implementation plan. The implementation phase focuses on actual implementation, with critical factors involving training and practical support, as well as evaluating the process, providing feedback, and making adaptations. The last phase focuses on the sustainability of the change, learning from the implementation process, and building on the processes and structures set in place to create long-term change (Meyers et al., 2012; Stefánsdóttir et al., 2022).

There are also factors on many levels that may act as barriers to achieving change in school staff's practical actions. These can be found at the macro, organizational, and individual levels (Barry et al., 2020; Domitrovich et al., 2008). At the macro level, municipal guidelines or structures may cause issues in the implementation process. At the organizational level, practical issues such as lack of resources or social issues related to, for instance, lack of collegial support, can arise. Finally, at the individual level, issues may arise because of a lack of training or individual reluctance to teach according to the program.

To ensure that the implemented innovations are relevant, effective, and useful for practitioners, their opinions about and experiences of implementation practices need to be highlighted. As teachers and other pedagogical staff are frontline implementers and decision-makers in the classroom, their experiences, opinions, and perceptions concerning the implementation process should be considered (Bourn, 2016; Davies & Ellison, 1997; Smul et al., 2019). They are crucial to actual change taking place. This can be exemplified by the

evaluation of the Swedish intervention project Prevention in School, based on the Norwegian PALS program (Ingemarson, 2018). The researchers concluded that they should have considered teacher opinions, and adapted the intervention and implementation process accordingly, to prevent expressions of unwillingness toward the intervention, the unintentional program drift and discontinuity in program use (Ingemarson, 2018). Previous SWPBIS studies have identified influencing factors in regards to leadership, resources, current practices and teachers' belief in behavior change (Fox et al., 2021). Factors influencing fidelity include attitudes toward evidence-based programs, perceived fit of the program, student–teacher relationships and previous actions toward unwanted behavior (Sørlie, 2021). For successful, sustainable, and appropriate change, implementation should be a simultaneous top-down and bottom-up effort (Fixsen et al., 2005), and the innovation goal and teacher autonomy need to harmonize. It is therefore important to consider how pedagogical school staff perceive barriers to and facilitators of innovation implementation, and a teacher questionnaire could provide a way to monitor staff's perceptions of interventions.

Determinants of Implementation Behavior Questionnaire

This study identifies barriers and facilitators perceived by staff working with the IBIS program using a questionnaire based on the Theoretical Domains Framework (TDF; Michie et al., 2005; Atkins et al., 2017) developed by combining 33 psychological theories related to different aspects of motivation (e.g., Social identity theory), action (e.g., Self-regulation theory) and organization (e.g., Demand-control model) of change. The TDF is a so-called determinant framework, with the primary aim of exploring factors enabling or hindering implementations. It is set apart from implementation frameworks translating theory into practice (process models) and evaluation frameworks (Nilsen, 2020). It is a tool to understand and adapt implementation processes to enable sustainable change. TDF focuses on the perspective of the frontline implementers and encompasses individual factors, organizational factors and factors on the macro level. The TDF constructs are structured in twelve domains that are hypothesized to represent three overarching components of implementation processes: *Capability*, *Opportunity*, and *Motivation*. *Capability* (C) includes overall skills and knowledge to engage in the activity, *Opportunity* (O) includes surrounding resources that the individual needs to engage in the activity, and *Motivation* (M) includes actions, internal and external, directed toward the activity (Michie et al., 2005, 2014). These components act together toward eliciting *Behavior change* (B), thus defining the COM-B system (Michie et al., 2011). The framework has been used to analyze implementation projects and behavior change, both qualitatively and quantitatively, in projects in multiple fields (Coulson et al., 2016; Davis et al., 2015; McGowan et al., 2020; Philip et al., 2015). The framework has been used in the field of health sciences (Birken et al., 2017; Dyson et al., 2011) but also to study implementation in educational settings (Baker-Henningham, 2018; Fohlin et al., 2021; Nylén et al., 2021; Weatherson et al., 2017).

Studies have shown that even though participants have found the TDF useful for evaluating and improving implementations, there is a need for a simple and practical guide on how to understand the different domains (Phillips et al., 2015). One way to reach this goal has been to operationalize the TDF into a questionnaire. Huijg et al. (2014) created the Determinants of Implementation Behavior Questionnaire (DIBQ) using the 12 TDF domains as a template and adding domains found to be important in previous studies to analyze factors influencing implementation behavior. After initial testing, the questionnaire consist of 18 domains and 93 items. The questionnaire is a tool that can guide researchers when they want to evaluate the implementation of innovations. The DIBQ has been used to evaluate implementations in healthcare in various contexts (Adrian et al., 2020; Fraser et al., 2018; Nacy, 2021; Okuyan et al., 2021; Ris et al., 2021; Schröder et al., 2020), as well as to evaluate policy compliance (Zaffar et al., 2018) and support implementation processes in schools (Hamdani et al., 2021).

By providing the adapted version of the DIBQ for school settings (DIBQ-S) we hope to expand the knowledge of school implementation research and development in Sweden in particular, as well as add to the international research base on implementation. The questionnaire can add value by increasing understanding of validated theoretical frameworks of change, such as the COM-B model, in combination with providing a practical tool to evaluate and adapt the process of change, such as the DIBQ-S. This can enable understanding of pedagogical school staff's attitudes toward implementation projects and help to improve future implementation processes. Therefore, it is of interest to investigate how the adapted questionnaire relates to the overarching theoretical model and how this can enable understanding of the implementation process.

A previous study on IBIS implementation (Nylén et al., 2021) highlighted factors that may influence attitudes to the program's implementation. One factor was the teacher's class level; it was indicated that teachers at different class levels may experience implementation differently. A second factor was the use of IBIS implementation teams. IBIS team members have gained experience with the program through training provided by external supervisors as well as by training others, potentially distinguishing their attitudes toward implementation from school staff who did not participate in such training. The influence of these factors can be further explored by relating DIBQ-S responses to the overarching theoretical constructs of the COM-B model to identify the psychological factors that are strengthened or weakened by these particular covariates. The response of the school staff involved in this implementation should be understood in its particular context. However, there are limited information regarding school staff's attitudes concerning school implementation, which makes this contribution a stepping-stone for future implementation projects to consider when planning, carrying out and evaluating their particular change.

Aim

The aim of this study is twofold; to examine the internal structure evidence of the DIBQ-S, and to describe school staff's attitudes toward IBIS program implementation. The research questions were:

1. Which factors do school staff perceive as potential barriers or facilitators?
2. Does the DIBQ-S show evidence on internal consistency?
3. Do the data support the theoretical model?
4. Do the variables *Member of the IBIS team* and *Teaching at early or later school years* predict staff's perceptions of IBIS implementation?

Method

Questionnaire adaptation

We adapted the Swedish version (Ris et al., 2021) of the DIBQ to capture the experiences of staff involved in change processes in an educational context. For example, questions related to policy and resources were adapted to suit the school setting. Additionally, original DIBQ Items 20, 21, 61, and 91 were removed as they are not applicable in the school context, and two items were added. The original English version (Huijg et al., 2014) guided the adaptation.

Table 1. The 18 domains covered in the DIBQ questionnaire (Ris et al., 2021) and their overarching categories (Michie et al., 2014; Schröder et al., 2020).

Capability	Opportunity	Motivation	
Knowledge	Innovation	Intention	Goal
Skills	Organization	Belief in capability	Student
Behavior regulation	Innovation strategy	Optimism	Social reinforcement
Characteristics of behavior	Socio-political context	Belief in consequences	Positive emotions
		Social/professional role and identity	Absence of negative emotions

Questionnaire content

The Swedish version of the DIBQ comprises 91 statements related to 18 domains. The domains related to the COM-B categories can be seen in Table 1, with domains arranged according to previous models (Michie et al., 2014; Schröder et al., 2020). Responses are scored on a 5-point Likert scale, ranging from 1 = *Completely disagree* to 5 = *Completely agree*. The majority of statements, 74 out of 91, are positively phrased, e.g., "I know how to use the IBIS program." However, seven statements are negatively phrased, e.g., "When I use the IBIS program, I feel nervous." Finally, ten questions are phrased to capture specific program features: difficulty carrying out the program, frequency of other tasks taking precedence over program use, sense of usefulness, sense of value, sense of pleasantness, interest in program content, and intention to keep working with the program content.

Participants and data collection

Participants were pedagogical school staff in a Swedish municipality implementing the IBIS program (Nylén et al., 2021). The term "pedagogical school staff" refers to any staff that the schools' principals deemed to be involved in teaching IBIS (e.g., classroom teachers, leisure teachers, special educators, etc.). Principals of schools involved in the IBIS project were invited to relay the e-mail addresses of school staff to the researcher for further recruitment. Eleven principals provided the e-mail addresses of 400 school staff. Those school staff received an e-mail containing relevant information and a link to the questionnaire. The participants received written consent forms in compliance with ethical guidelines (All European Academies, 2020; Swedish Research Council, 2017). Participants were assured of anonymity and confidentiality. The information package stated that participation in the questionnaire was voluntary and separate from project implementation. Of those staff who received an invitation e-mail, 127 (32%) completed the online questionnaire between October 2020 and February 2021. Respondents provided information about their gender, work history, and role at their current school, and completed the DIBQ-S questionnaire. The participant variables in focus for this study were *Member of IBIS team* (yes = 33.6%, no = 66.4%) and *Teaching at early (K to grade 3) or later (grade 4–9) school years* (early = 39.5%, later = 40.5%; see Table 2).

Data management

The questionnaire was constructed in Survey and Reports (Artologik, 2019). Answers were exported to SPSS (IBM Corp., 2019), containing the responses' initial coding between 1 = *Completely disagree* and 5 = *Completely agree* at an interval scale. Negatively phrased items were reverse coded. To perform CFA, the data were exported to Mplus 8.6 (Muthén & Muthén, 2021).

Table 2. Participant information.

	Sample (n = 128)	
Variables	*N*	%
Class level of teaching		
Early school years (grades K-3)	51	39.8
Kindergarten	8	6.3
Grades 1–3	43	33.6
Later school years (grades 4–9)	52	40.5
Grades 4–6	38	29.7
Grades 7–9	14	10.9
Member of the IBIS team		
Yes	43	33.6
No	85	66.4

Note: The reported grade of teaching also included: afterschool care 8.5%, across multiple grades 6.3%, and missing/do not teach 4.7%.

Analytical procedure

Internal structure evidence (Cook & Beckman, 2006) was examined by testing internal consistency as well as model fit using CFA. The initial structural investigation was performed by determining items' Cronbach's alpha (α) concerning their assigned domains. Cronbach's alpha scores range from 0 to 1, with values below 0.67 considered poor, values in the range of 0.67–0.8 considered fair, values in the range of 0.81–0.9 considered good, values in the range of 0.91–0.94 considered very good, and values above 0.94 considered excellent (Mohamad et al., 2015).

The response rate was lower than expected, and it was probably affected by the COVID-19 pandemic. To handle the limitations due to the low number of participants, we adopted the parceling technique Little et al. (2002) suggested. The 91 items were thus reduced into 20 parcels, based on the 20 hypothesized domains (see Table 3). This was done by calculating the mean values on the items included in each parcel. This enabled analysis of the model with an item-to-participant ratio in line with previous recommendations (Wolf et al., 2013). Parceling of the items into their related domains makes theoretical and empirical sense (Little et al., 2002). Theoretically, the study aimed to examine the relationships between the domains and the overarching frameworks, meaning that the potential variance in a single item was not in focus but rather the collected domain content was emphasized. This has empirical advantages in terms of noise reduction, as parceling stabilizes the data, which, in turn, helps reveal the relationships between observed and latent variables (Matsunaga, 2008).

Model fit was explored using the robust maximum likelihood (MLR) model given the non-normally distributed data and the continuous variables (Li, 2016). To evaluate overall fit, the Chi-square test (χ^2), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the standardized root mean squared residual (SRMR) were used. Chi-square is used to evaluate whether the null hypothesis of there being no relationship between the theoretical model and the data and a good fit would result in a p-value above 0.05 (Kline, 2011). Threshold values for acceptable fit of the other measures were RMSEA at <0.05 indicating good fit and RMSEA at 0.1 indicating bad fit, CFI of >0.95 indicating good fit, and SRMR of <0.08 indicating acceptable fit (Kline, 2011). Modification fit indices (M.I.) were used to improve the model. A general threshold value of 0.6 for acceptable factor loading for observable variables on latent variables has been suggested (Hair et al., 2010).

Table 3. Mean value, standard deviation, and Cronbach's alpha for the DIBQ-S domains.

Scale	*N*	*M*	*SD*	*α*
Absence of negative emotions	122	4.60	0.69	0.89
Social/professional role and identity	121	4.54	0.79	0.92
Intention	123	4.39	0.92	0.92
Social reinforcement	117	4.13	0.74	0.91
Expectation of results	123	4.10	0.84	0.95
Knowledge	124	4.10	0.87	0.95
Attitude	123	4.02	0.94	0.95
Organization	124	3.99	0.90	0.89
Optimism	125	3.96	0.70	0.76
Innovation strategy	122	3.89	0.84	0.86
Skills	122	3.85	0.87	0.79
Characteristics of behavior	121	3.82	0.85	0.85
Innovation	125	3.80	0.72	0.80
Belief in capability	117	3.70	0.73	0.91
Positive emotions	125	3.69	0.96	0.94
Students	126	3.55	0.99	0.97
Socio-political context	123	3.43	0.96	0.81
Reinforcement	123	3.33	1.01	0.88
Behavior regulation	118	3.24	1.00	0.93
Goals	122	2.91	0.92	0.78

Note: Mean values ranging from 1.00 to 5.00.

The mean of items belonging to the same domain was calculated. Previous studies have interpreted the results of the questionnaire differently (Kolehmainen et al., 2020; Kunstler et al., 2019; Ris et al., 2021; Schröder et al., 2020; Shu et al., 2021; Zaffar et al., 2018). This study considered values below 3.5 as barriers, values between 3.5 and 4.0 as factors in need of attention, and values at or above 4.0 as facilitators.

The multiple indicators multiple causes model (MIMIC) was used to answer the fourth research question. Building on the CFA model, dummy variables were added for the two covariates *Member of the IBIS team* (yes = 1, no = 0) and *Teaching at early or later school years* (early = 1, later = 0) to explore their impact on the model's latent variables.

Results

Initial analysis

Initial analytical adaptations of the model resulted in division of the domain *Belief in consequences* into its three constructs: *Attitude*, *Expected results*, and *Reinforcement*. The constructs represent different aspects of expectations of implementation, which means that participant attitudes may differ on the different constructs, as indicated in the participants' responses below.

The data underwent analysis to identify patterns in missing data. Non-responses were found at both the item and scale level (domains), but these were interpreted as issues due to missing completely at random (MCAR) or missing at random (Newman, 2009). Little's MCAR test indicated that the data were MCAR (Chi-square: 3867.50, $df = 3937$, sig = 0.78). We thereby assumed that the non-responses were not attributable to questionnaire content. The missing data were handled using listwise deletion in SPSS and full information maximum likelihood in Mplus.

Descriptive statistics

The questionnaire's mean scale score ($M = 3.86$, $SD = 0.58$) indicated that the school staff perceived the program as having more facilitators than barriers. As shown in Table 3, seven domains (Absence of negative emotions, Social/professional role & identity, Intention, Social reinforcement, Expectation of results, Knowledge, and Attitude) had a mean score above 4, indicating that these factors can be considered facilitators to program use. The domains *Organization* and *Optimism* had mean scores just below the 4.0 threshold. Eight domains (Innovation strategy, Skills, Characteristics of behavior, Innovation, Beliefs about capability, Positive emotions, and Students) scored between 3.5 and 3.9 and could thus benefit from closer attention. Finally, three domains (Socio-political context, Reinforcement, and Behavior regulation) scored between 3.00 and 3.50, and one domain (Goals) scored 2.91, indicating that these are potential barriers.

Internal consistency

Cronbach's alpha values indicated a strong correlation between the items and their related domains, with alphas ranging from 0.76 to 0.97, as presented in Table 3. Four domains showed fair reliability (0.76–0.8), six domains had good reliability (0.81–0.89), six domains had very good reliability (0.91–0.94), and four domains had excellent reliability (0.95–0.97).

Model analysis

Using CFA in Mplus, we tested the predicted model with the 20 parcels on the three factors corresponding to the COM-B model: *Capability*, *Opportunity*, and *Motivation*. This resulted in a model with poor fit (see Table 4). We applied the suggested M.I. to modify Model 1 when the modifications were conceptually justifiable. *Innovation* was related to *Capability* and *Motivation*, and

Table 4. Fit indices of three CFA models with the theoretical model and the DIBQ-S items.

Model	*p*-value	χ^2	*df*	RMSEA	CFI	SRMR
Model 1	<0.00	536.19	167	0.132 (0.120–0.145)	0.790	0.073
Model 2	<0.00	304.20	159	0.085 (0.070–0.099)	0.917	0.055
Model 3	0.11	31.36	23	0.054 (0.000–0.096)	0.988	0.034

Belief in Capability was related to *Capability*. The M.I. also indicated significant residual error correlations, which were added to the model. The modified 3-factor model (Model 2) showed a better fit, with RMSEA and SRMR indicating a fair fit, while the CFI value improved, though it did not reach the recommended threshold value of >0.95. The path diagram for Model 2 is shown in Figure 1.

With the current data, we were unable to build a satisfactory 3-factor model. However, a 2-factor model (Model 3) exclusively retaining the indicators of *Capability* and *Opportunity* with significant residual error correlations (see Table 4 and Figure 2) showed an acceptable fit, with a non-significant Chi-square *p*-value, RMSEA indicating fair fit, and CFI and SRMR indicating good fit. The residual error correlation showed correlations between the observed variable *Skills* and the variables *Knowledge*, *Innovation strategy*, and *Belief in capability*.

The factor loadings for the 2-factor model were generally high and consistent, as seen in Table 5. Loadings for the latent variable *Capability* ranged from 0.73 to 0.90, and those for *Opportunity* ranged from 0.71 to 0.82.

Regression of variables on model

Using the 2-factor model, regression coefficients of the covariates *Member of IBIS team* and *Teaching at early or later school years* on the latent variables *Capability* and *Opportunity* are presented in Figure 3. The MIMIC model showed an overall fair fit ($\chi^2 = 53.714$, $df = 37$, $p = 0.037$, RMSEA = 0.060, CI = 0.015−0.093, CFI = 0.976, SRMR = 0.042). Teachers working in the early school years (K to Grade 3) perceived higher *Capability* ($\beta = 0.29$) and *Opportunity* ($\beta = 0.25$) than teachers working in the later school years (Grades 4–9). When considering the impact of IBIS team membership, team members had a higher perception of *Opportunity* ($\beta = 0.34$).

Discussion

This study examined the responses to the adapted DIBQ-S of pedagogical school staff involved in IBIS. When asking school staff to rate their IBIS implementation experience, it is both the implementation process and the intervention content that will determine how the innovation is perceived. When considering the barriers and facilitators in relation to the categories *Capability*, *Opportunity*, and *Motivation*, some patterns emerged. The items related to *Motivation* showed the most facilitators, with six out of ten domains above 4.0. Conversely, the domains related to

Table 5. Factor loadings of CFA with latent variables Capability and Opportunity and their loading observed variables.

Items/latent variables	Capa	Opp
1. Knowledge	0.80	
2. Skills	0.73	
3. Characteristics of behavior	0.79	
4. Behavior regulation	0.83	
5. Belief in capability	0.90	
6. Innovation	0.84	
7. Socio-political context		0.71
8. Organization		0.80
9. Innovation strategy		0.82

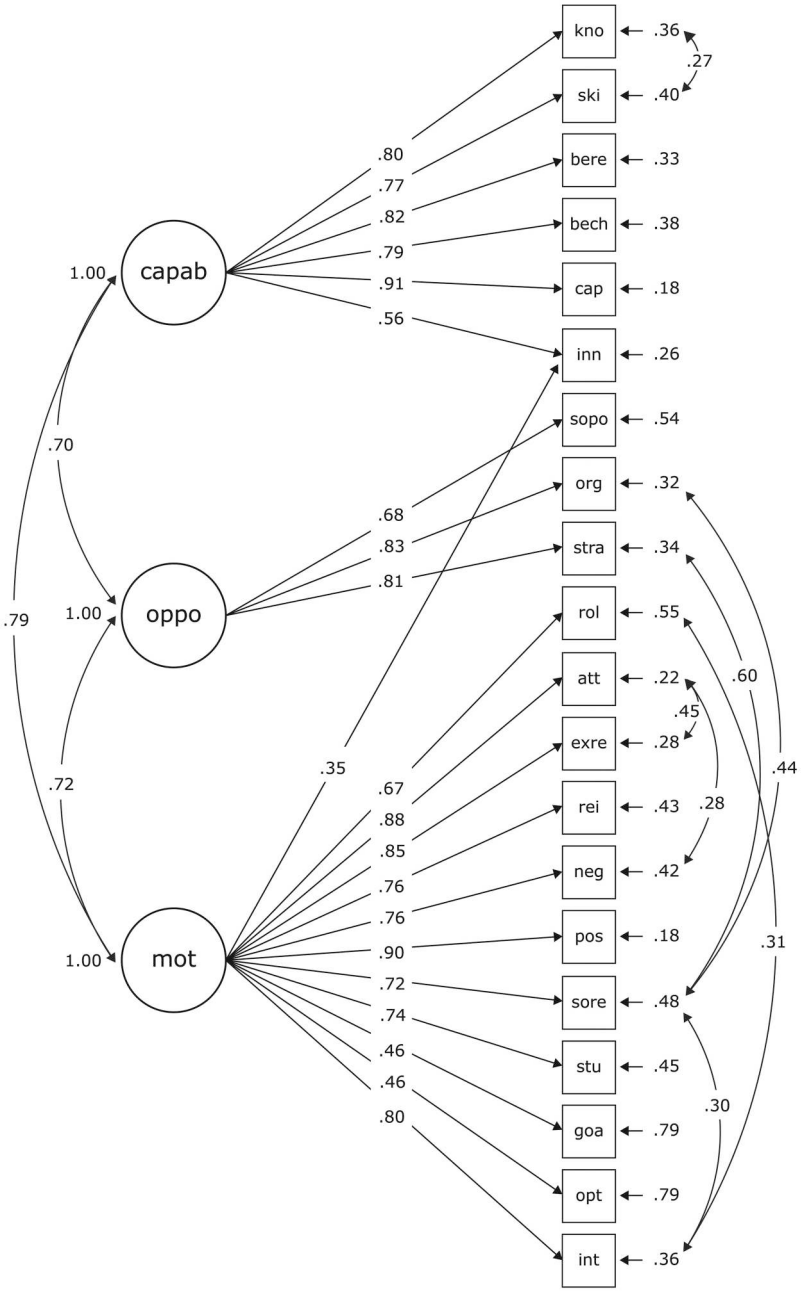

Figure 1. Path diagram of CFA representing the factor loadings of the DIBQ-S items on the COM-B system.

Capability and *Opportunity* were all rated below 4.0. This could indicate that the school staff perceived the IBIS content to have a better philosophical rather than practical fit (Moore et al., 2013), motivating the teachers to keep learning and adapting to integrate the content into their educational practice, while the opportunities and capabilities given during the implementation process could improve.

The results indicated adequate internal structure evidence for the use of the DIBQ-S regarding the internal consistency. The questionnaire showed fair ($\alpha = 0.76$) to excellent ($\alpha = 0.97$) internal

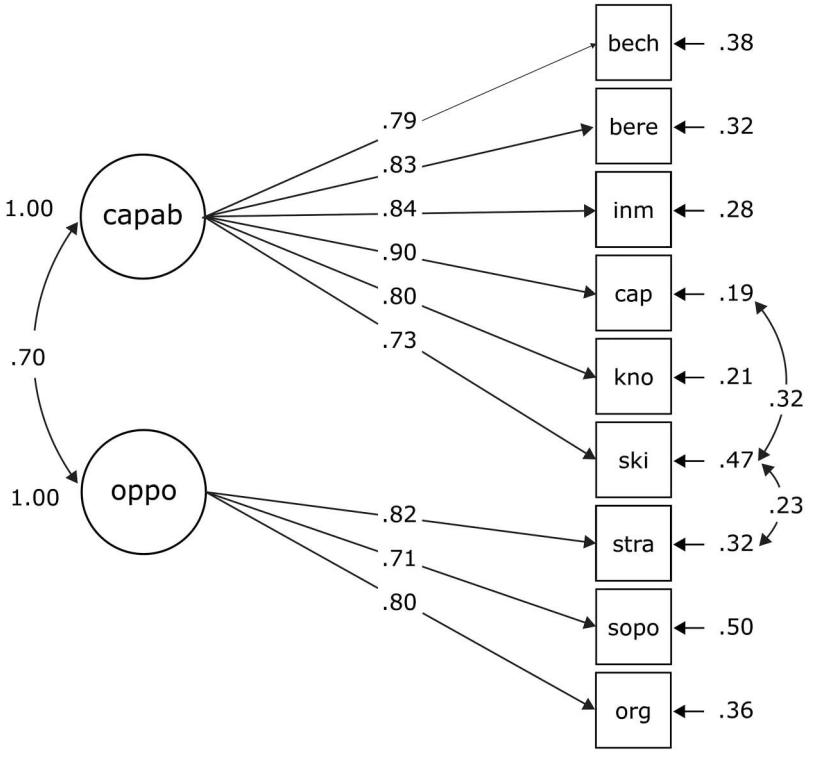

Figure 2. Path diagram of CFA representing the factor loadings of the DIBQ-S items on the latent variables Capability and Opportunity.

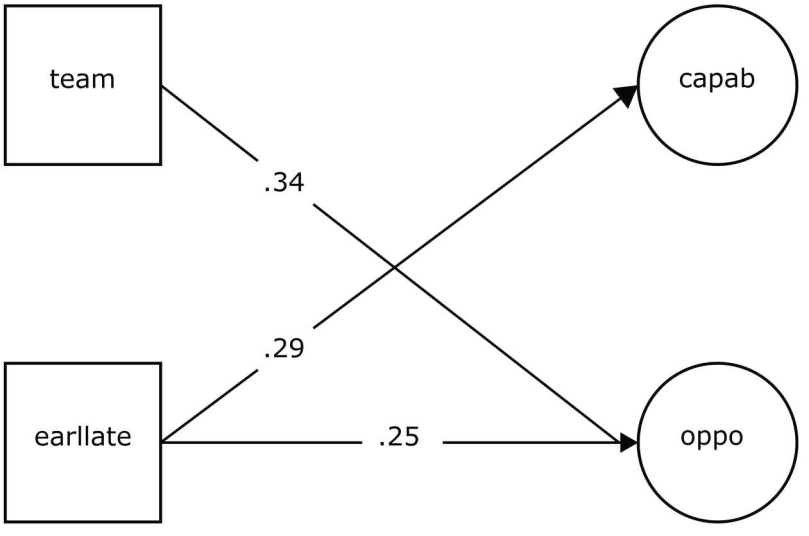

Figure 3. MIMIC model regressions of covariates earlier/later school years and member of IBIS team on latent variables Capability and Opportunity.

consistency. However, based on the empirical data, we could not build a model with good fit corresponding to the theoretical COM-B model (Michie et al., 2014; Schröder et al., 2020). However, a 2-factor model based only on the indicators of *Capability* and *Opportunity* showed a good fit. The

domain *Innovation*, related to the innovation's practicality and functionality, was expected to belong to *Opportunity*. Adhering to the CFA model, the parcel *Innovation* significantly loaded on both *Capability* and *Motivation* but not on *Opportunity*. This may be because the innovation's functionality corresponds to the school staff's perceived *Capability*, and the innovation's suitability corresponds to the perceived philosophical fit, relating it to *Motivation*. We would argue that the loading of *Belief of capability* on *Capability* instead of *Motivation* makes theoretical sense. Belief in the ability to carry out a process is highly related to questions regarding the ability to carry out the same process.

Exploring the dummy variable *Member of the IBIS team* revealed that the IBIS team members perceived significantly higher *Opportunity*. The difference in perceived opportunity could be due to the IBIS team members' further insights into the process and resources devoted to the implementation. It is, however, surprising that this sample did not reach a significant difference between perceived *Capability*, as the members of the IBIS team were trained in the program and supervised by IBIS supervisors, and they also trained and supervised in-service teachers.

The findings of this study concerning the dummy variable *Early/late years* add evidence to the results of a previous study (Nylén et al., 2021) conducted in this population: School staff working in the later school years express more potential barriers than school staff working in the early school years. One reason for this could be the increased academic focus in later school years, which could influence teachers' attitudes toward working with innovations not directly related to subject content. The results have highlighted the importance of performing evaluations and adaptations in the implementation phase (Meyers et al., 2012), where teachers' thoughts and practices can guide implementation progress. Furthermore, this illustrates the need to examine why this difference occurs, how additional support can be provided to teachers working in the later school years, and whether the implementation process or content should be adapted to better fit these teachers and their students.

Limitations and considerations

One aim of this study was to test the fit of the DIBQ-S on the theoretical model of COM-B. With the available data, we could not produce a 3-factor model with a good fit on all indices. Further tests with larger samples are warranted to investigate the DIBQ-S' factor structure. We built a measurement model with good fit for the latent variables *Capability* and *Opportunity*, which could be applied in further analysis of implementation processes and differences between participants. It is possible that the indicators of *Motivation* in the present DIBQ cover several constructs rather than one. Additional explorations of the *Motivation* constructs with larger samples could find a more satisfactory structure than we could in this limited first application.

The data for this study were collected during the first year of the COVID-19 pandemic, a circumstance that could have influenced the response rate. Principals of schools involved in the IBIS project choosing not to participate with their staff created the first attrition stage. A 32% response rate was reached among the school staff that received the questionnaire, which is potentially a lower rate than would have been reached in a less stressful time for the school staff. It is also possible that the staff that answered the questionnaire had a greater interest or had stronger opinions about the IBIS implementation than nonparticipating staff. The impacts of this can be seen in the overrepresentation of the IBIS team members. The IBIS team members made up about 16% of the 400 staff receiving the questionnaire, but made up 33.6% of the responses. The MIMIC model illustrates how this group may have affected the mean rating of the domains.

More research is needed to validate the questionnaire; other investigations in other contexts and with larger sample sizes could provide further insights into the questionnaire's usability and validity in school settings. The evidence of the internal structure found in this study need to be explored in further studies to ensure that it was not context-bound. However, this study is the first step,

showing that the TDF model applied to the questionnaire is at least partially confirmed by empirical data. Examples are provided of how it can be employed to investigate teachers' experiences in professional development, interventions, and similar initiatives.

The use of the DIBQ-S in this population showed good internal consistency. However, 10 out of 20 domains displayed a Cronbach's alpha above 0.9, which, it has been argued, could indicate item redundancy (Tavakol & Dennick, 2011). Reducing the number of items by removing those that are highly correlated could yield a shorter questionnaire, reducing participants' time expenditure and producing a more efficient implementation tool.

Conclusion

Pedagogical school staff expressed generally positive attitudes toward IBIS program implementation, with motivational factors rated the highest. The study has highlighted not only the importance of considering school staff's perceived capabilities, opportunities, and motivation with respect to implementation but also the impact of participant factors such as role assignment in the implementation process and teaching at different class levels. While the constructs *Capability* and *Opportunity* were measured satisfactorily with CFA, measurement of *Motivation* using the DIBQ-S items should be further examined.

The knowledge gained from this study can guide the sustainability process and future implementation of IBIS in Sweden as well as in other contexts. The results show what feedback can be obtained using a determinant questionnaire, which is relevant to researchers, school leaders, and others involved in implementation, highlighting the perceived strengths and weaknesses of implementation and practical fit regarding the different domains. This knowledge can be used as a stepping-stone to identify, improve, and build on facilitators to handle and overcome potential barriers to implementation.

This paper extends use of the DIBQ into the educational field. The findings indicate that this questionnaire could be a valuable tool to support and adapt an implementation process to make it feel coherent, manageable, and meaningful to all school staff carrying out changes in the educational setting.

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