

Student voice in educational change: Approaches to enhancing motivation within the classroom

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Abstract

Student voice (SV), referring to the concept and practices of involving students in educational decisions, has been gaining popularity due to its promising effects on student need satisfaction and academic motivation. Definitions of SV approaches, their variety, and the benefits that various approaches have for students' need satisfaction and learning motivation are crucial for effective practical implementation and future studies on SV. The present study explores whether SV approaches vary on the components of curriculum design about which students *can* and *want* to have a voice as well as examining the relationship between various approaches to need satisfaction and autonomous motivation. The relationship between not adapting approaches to students' wishes with need satisfaction and autonomous motivation has also been examined. Exploratory factor analysis revealed three distinctive approaches: content, evaluation, and lesson practicalities. Structural analysis substantiated the benefits that SV approaches may have for students' needs and motivation, with the strongest relationships shown between content-based approaches and need satisfaction. Adverse relationships were found when approaches did not correspond with the students' wish for SV. SV approaches that strike a balance between listening to students' voices and challenging students to gradually gain more SV about content may prove to be the most advantageous for students' need satisfaction and learning motivation.

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KEYWORDS

learning motivation, school improvement, student voice, teacher–student collaboration

Context and implications

Rationale for this study: Student voice, referring to the concept and practices of involving students in educational decisions, has been gaining popularity in both research and practice in order to address students' progressively declining learning motivation.

Why the new findings matter: Defining student voice approaches, their variety and associated benefits are crucial for effective practical implementation of them.

Implications for practitioners, policy makers, and researchers: The findings of this study demonstrate that implementing student voice approaches within the classroom is an advantageous strategy for supporting satisfaction of students' basic psychological needs and autonomous motivation, with approaches related to content-based curriculum components leading to the most benefits. When approaches did not correspond to students' wishes for student voice, need frustration was a factor. Challenging students to gradually gain more student voice about content while listening to students' voices may prove to be most advantageous. We would encourage student voice initiatives, perhaps redundantly and self-evidently, by listening to students' voices.

INTRODUCTION

Secondary students' school performance and general well-being has been progressively declining across the globe, concomitant with an increase in (chronic) absenteeism, which has been related to decreased autonomous learning motivation (Bureau et al., 2022; Kahne et al., 2022; Wijsman et al., 2016). This decline has been exacerbated by the pandemic, leading to widespread concern about students' well-being and motivation to learn (Dutch Inspectorate of Education, 2021, 2022; Fong, 2022). Consequently, schools are searching for sustainable change initiatives which are able to address students' progressively declining learning motivation (Dutch Inspectorate of Education, 2022; Scanlon, 2012). Students have a great interest in what happens at school, and can offer valuable insights and perspectives on their education and existing issues (Mitra & Gross, 2009; Scanlon, 2012). However, students are often talked about and spoken for, but rarely actively included as knowledgeable stakeholders (Cook-Sather, 2020; Fielding & Rudduck, 2002; Scanlon, 2012). Consequently, students often feel like experimental participants and resist innovation, hindering the effectiveness and sustainability of well-intentioned school-improvement initiatives (Mitra & Gross, 2009; Scanlon, 2012). Involving students in educational decisions, sharing ownership and responsibility, has been shown to improve the effectiveness of school-improvement initiatives, instructional practices, school culture, student attendance and enrolment, and teacher job satisfaction (Conner et al., 2022; Cook-Sather, 2020; Mitra & Gross, 2009; Reeve & Cheon, 2021; Scanlon, 2012). Involving students not only provides opportunities

for direct feedback and insight on what students need, but also raises student awareness of learning, teaching, and school structures (Mitra, 2003).

For this reason, the popularity of initiatives that involve students as active agents in (re) designing education to better suit their interests and needs has risen in both research and practice (Toshalis & Nakkula, 2012). Student voice (SV) is an umbrella term for the concept and practices of empowering students and offering opportunities in which they can express their voice and affect their education in ways that are significant to them and their peers (Cook-Sather, 2020; Fielding, 2001). SV goes beyond student-centred practices, as it is not only centred around students' needs and interests, but is also inherently committed to student agency: taking action to transform current practices and beliefs (Cook-Sather, 2020; Lundy, 2007; Virkkunen, 2006). In practice, the relationship between student voice and agency depends on the existing beliefs within the school culture about the role of students (Toshalis & Nakkula, 2012). At a minimum, SV approaches empower students who don't have the authority to make changes to exert influence through informative or consultative roles (Toshalis & Nakkula, 2012). For example, students may be asked for their opinion about instruction but their teacher decides how their input is used. However, approaches that genuinely support SV empower students as change-agents, taking the lead in the creation of educational policies and practices with professionals as mentors (Cook-Sather, 2020; Fielding, 2001). Students may collaborate with their teacher to shape classroom learning or take the lead in changing school practices. As students' daily learning experiences and learning motivation are largely influenced by their teachers (Hattie, 2009), teachers and their dispositions towards SV play a significant role in facilitating SV (Cook-Sather, 2020; Hattie, 2009; Shernoff et al., 2003).

The growing body of research suggests that SV initiatives show promise for supporting students' needs, autonomous motivation (AM), and academic performance (Conner et al., 2022; Cook-Sather, 2020; Mitra & Gross, 2009; Reeve & Cheon, 2021). However, qualitative studies that examine the benefits of SV, particularly of various approaches and at the classroom level, are sparse, and quantitative studies examining the effects of various SV approaches are particularly lacking.

Differentiating and defining the variety of SV approaches, particularly within the classroom, is necessary to study what approaches are most advantageous in supporting students' needs and improving their motivation to learn. Despite the general consensus on how the students' role within the school is framed leads to different approaches, little is known about the curriculum components about which students can and want to have a voice. Even less is known about the effects of various SV approaches and of not adapting approaches to students' wishes for SV as far as support of their needs and their AM.

Student voice and its potential for improving need satisfaction and motivation to learn

Students' AM to learn plays a significant role in their well-being, school performances, development, and school attendance (Bureau et al., 2022; Kahne et al., 2022). Self-determination theory (Deci & Ryan, 2002) posits that AM requires volition to learn and is self-determined. AM is driven by intrinsic regulation (i.e. personal interest and enjoyment) or identified regulation (i.e. personal value or importance). In contrast, controlled motivation is driven by external factors not related to learning, often involving feelings of coercion, and is, therefore, non-self-determined (Deci & Ryan, 2002; Vansteenkiste & Ryan, 2013). Controlled motivation is driven by external regulation (i.e. rewards or punishments) or introjected regulation (i.e. internal or external pressure). It is associated with general unhappiness (e.g. anxiety and reduced social-emotional functioning) and decreased physical

well-being and vitality (Howard et al., 2021). The more self-determined the regulation of motivation is, the stronger its relationship with learning performances and well-being (Bureau et al., 2022; Howard et al., 2021; Kahne et al., 2022). Identified regulation is also uniquely associated with persistence of learning, as it depends less on the student's emotive state (Howard et al., 2021).

AM can be supported by the environment when it satisfies three basic psychological needs (BPN): competence, autonomy, and relatedness (Deci & Ryan, 2002). Satisfaction of students' needs leads to engagement, mastery and synthesis. In contrast, if needs are not satisfied, a decrease in (or lack of) AM, development, integrity, well-being, and adaptive mechanisms can be observed (Deci & Ryan, 2002; Vansteenkiste & Ryan, 2013). Giving students a voice about educational decisions has been shown to support need satisfaction and is related to increased engagement and improved learning motivation (Conner et al., 2022; Earl & Lee, 2000; Fielding, 2001; Kahne et al., 2022; Mitra, 2004; Rudduck & Fielding, 2006; SooHoo, 1993).

Satisfaction of the need for competence relates to students' feeling of confidence in their own abilities and opportunities to develop and make use of their abilities (Deci & Ryan, 2002). Numerous theories and studies have demonstrated that students are more engaged when presented with tasks that find a balance between challenging them and matching their skills, including Vygotsky's (1978) zone of proximal development, the scaffolding theory (Shernoff et al., 2003), and Csikszentmihalyi's (2000) flow state theory. Satisfaction of the need for competence is particularly important in education where it is the driving factor for motivation to learn, likely due to the strong focus on performance, (Bureau et al., 2022). Moreover, perceived competence is also directly associated with better school performance (Richardson et al., 2012). SV approaches support satisfaction of the need for competence, as students are given a platform on which they are trusted to act as teachers' equals (Fielding, 2001; Mitra, 2004). They gain confidence in their ability to identify problems, find their own identity and perspective, solve problems and change matters, and cooperate and negotiate (Mitra, 2004; Rudduck & Fielding, 2006).

Autonomy relates to a feeling of ownership of and responsibility for one's own (learning) behaviours (Deci & Ryan, 2002). It relates to the need of acting voluntarily and in alignment with one's own values and interests and is therefore closely linked to self-identity (Guay, 2022; Shirley & Hargreaves, 2012). Although the need for autonomy is the second strongest predictor of academic motivation (Bureau et al., 2022; Shernoff et al., 2003), it is often students' least satisfied need within the compulsory school context (Earl et al., 2019). Increasing SV at school-level has been shown to support students' need for autonomy as students and may better suit their educational needs and interests (Mitra, 2004). While SV may support autonomy satisfaction, they are not the same. Autonomy-supportive teaching, although definitively student-centred, does not necessarily require students to have a voice to support their own learning (Cook-Sather, 2020; Reeve & Cheon, 2021). For example, supporting internalisation (i.e. the process of internalising other's values and beliefs) by providing rationale supports autonomy but does not promote SV. Likewise, adapting teaching to students' interests supports autonomy but does not necessarily require students to have a voice (Reeve & Cheon, 2021).

Satisfaction of the need for relatedness pertains to the feeling of belonging, feeling connected to others, and wanting to be accepted by peers and teachers (Deci & Ryan, 2002). Relatedness, despite having the weakest relationship with academic motivation of the three needs (Bureau et al., 2022), is essential for the internalisation of external cues necessary to become a more self-determined learner (Deci & Ryan, 2002). Shifting the interaction between teacher and students from authoritative to collaborative has been shown to support students' sense of belonging to their teachers, their peers, the school, and the community (Kahne et al., 2022; Mitra, 2004). Including students in (re)designing education has also

been shown to break the 'us versus them' polarity that sometimes exists between educators and students, diverting the focus towards addressing school-wide issues collaboratively instead of blaming the other (Fielding & Rudduck, 2002; Mitra, 2004).

However, qualitative studies on the relationship between SV approaches, need satisfaction and motivation to learn are often done in student bodies in which a group of students, who arguably do not represent all students, identify school-wide issues and take the lead in resolving those issues (Fielding, 2001; Mitra, 2004; SooHoo, 1993). Less is known about approaches that involve all students, and about approaches and their variations within the classroom and aimed at classroom-level. What is more, students' perception of need support by their teacher was shown to vary greatly within the classroom and differed from teachers' perception of need support (Domen et al., 2020). These findings emphasise the need for involving all students in teaching strategies to improve need satisfaction and AM. Lastly, although quantitative research has demonstrated a positive relationship between responsiveness to SV and student engagement, assessment of SV used single statements such as: 'Teachers really listen to what I have to say' (Conner et al., 2022) or 'If students express concerns to their teachers about their class, teachers are responsive' (Kahne et al., 2022). While single-item measurements have their benefits and provide valuable insights (Conner et al., 2022), multi-item measurements are needed to estimate reliability and to be able to differentiate between approaches. More recently, a multi-item psychometrically validated scale on SV has been developed that measures student leadership capacity within the school (Lyons et al., 2020). However, a multi-item instrument measuring SV within the classroom, particularly measuring the variety of approaches, is needed to examine the benefits that SV and its various approaches may have.

Hence, research on the effectiveness of SV approaches is hindered by unclear definitions of approaches, particularly within the classroom, and suitable instruments such as a validated SV scale.

Differentiating student voice approaches

Teachers' perspectives on the student role within the school are generally believed to lead to notably different SV approaches (Toshalis & Nakkula, 2012). Consequently, taxonomies that differentiate SV approaches are based on the premise that SV can vary in how involved students are, ranging from students as evaluators to students as leaders. As students' influence and agency increase, so do their accountability and responsibility for educational decisions (Toshalis & Nakkula, 2012). Among these taxonomies are: Fielding's SV taxonomy (Fielding, 2001), the participation ladder (den Otter et al., 2018; Hart, 1992), and Toshalis and Nakkula's (2012) spectrum of SV activity.

The participation ladder includes three tokenistic approaches that are arguably not genuine SV approaches (den Otter et al., 2018; Hart, 1992). Tokenistic approaches appear to involve students in educational decisions, without them having any real influence. For instance, students are asked to fill in a questionnaire but their perspectives are not taken into consideration or there is no follow-up. Similarly, student bodies may be created without considering if these students can, and do, represent all students (Hart, 1992). Tokenistic approaches are often used manipulatively to gain control of student and/or public perception of the school, rather than empowering students with the aim of reforming education for students' benefit (Fielding, 2001; Hart, 1992).

At the lower end of genuine SV approaches, students function as informants or consultants and have some influential power to affect their education, but have no authority, accountability, or responsibility for educational decisions (Toshalis & Nakkula, 2012). Although

it is debatable whether these approaches truly facilitate SV, students indisputably affect their education by giving their perspectives and opinions if these are genuinely taken into consideration (Toshalis & Nakkula, 2012).

Students gain more influential power when approaches aim at educator–student collaboration; sharing some authority, accountability, and responsibility for educational decisions with educators (Toshalis & Nakkula, 2012). Collaborative approaches can vary depending on the division of authority between students and educators. For example, educators can present students with choices, handing over some sense of control. Alternatively, formal and regular opportunities can be offered in which students can advocate for the changes they desire (Reeve & Cheon, 2021; Toshalis & Nakkula, 2012).

Students take the lead in student-led approaches and have authority, accountability, and responsibility for educational decisions (Toshalis & Nakkula, 2012). Agency and SV are strongly related in these approaches (Cook-Sather, 2020). Students can take the lead in matters they would like to address, make action plans to spark changes, and execute plans. They can also be invited to pursue their own interests and shape their own learning (Reeve & Cheon, 2021). In these approaches, students are in control and take responsibility for outcomes, and adults can be asked for help when needed (Toshalis & Nakkula, 2012).

Although SV approaches evidently vary in the degree of SV, it is conceivable that approaches can also vary depending on the aspects that students have a voice on. For instance, students can have more influence on the learning content, but less so on the evaluation of learning. The aspects that students can influence can be viewed within the perspective and broad definition of curriculum design. The spiderweb of curriculum design (van den Akker, 2003) provides a comprehensive categorisation of curriculum design. The spiderweb weaves 10 curriculum components in a web and addresses the planning of student learning at every organisational level: rationale, aims and objectives, content, learning activities, teacher role, materials and resources, grouping, location, time, and assessment (van den Akker, 2003). Education professionals and students can want to have or increase SV about certain (combinations of) components, thereby choosing a certain SV approach that requires a certain set of activities and instruments (Toshalis & Nakkula, 2012).

Indeed, autonomy-supportive teaching practices have previously been categorised as organisational practices (i.e. concerning classroom management issues such as deciding on grouping, seating arrangements, and evaluation procedures), procedural practices (i.e. concerning the use of materials in class, the form of assessment, and discussing wants), and cognitive practices (i.e. concerning learning goals, learning strategies, and evaluating learning; Stefanou et al., 2004). Moreover, these distinctive autonomy-supportive practices had differing effects on student engagement (Admiraal et al., 2022; Stefanou et al., 2004). Although all three types of practices were related to improved student engagement, cognitive-supportive teaching practices had longer lasting effects on engagement and deeper learning, particularly when students created thoughts, plans, and actions themselves (Admiraal et al., 2022; Stefanou et al., 2004).

It seems likely that SV approaches can likewise vary on (combinations of) curriculum components and that SV approaches to some components could be more beneficial for students' need satisfaction and AM. As cognitive student involvement led to longer lasting engagement (Stefanou et al., 2004), SV approaches addressing the more cognitive curriculum components, such as learning content or learning objectives, might be more effective in supporting AM than approaches addressing the more organisational curriculum components, such as the use of materials. It is similarly conceivable that students' wish for SV varies per curriculum component. Students could very well be more interested in having SV about the more superficial structural components than the cognitive components, even though the former may have weaker long-lasting effects on motivation (Stefanou et al., 2004).

The present study

In the search for change initiatives that actively involve students in addressing the motivational issues present, it is vital to understand what practices are most effective. Although research is promising on the potential that SV initiatives have for need satisfaction and improvement of motivation to learn, unclear definitions of SV approaches hinder research on the effects of various approaches. The present study aims to gain insight into the relationship between perceived student voice and satisfaction of students' BPN and AM to learn. To that end, we explored whether SV approaches vary with regard to the curriculum components about which students can and want to have SV. Lastly, we investigated what the relationships are between not adapting SV approaches to match students' desired SV approaches, and satisfaction of students' BPN and AM to learn. A graphical representation of the structural relationships examined can be found in [Figure 1](#). The research questions were as follows:

1. What categories can be discerned that differentiate SV approaches by the components of curriculum design?
2. What is the relationship between SV approaches and the satisfaction of students' BPN and their AM to learn?
3. What is the relationship between not adapting approaches to students' ideal SV and the satisfaction of students' BPN and their AM to learn?

METHODS

Context and procedure

A national four-year project (Students4Change!) was founded in response to requests from practitioners and policy-makers for urgent action plans that address students' declining learning motivation in the Netherlands (Dutch Inspectorate of Education, [2021](#), [2022](#)). Within the project, practitioners at nine secondary schools, three teacher training schools, and one university collaborate with researchers in design-based research to reorganise education and increasing student voice. Schools voluntarily signed up for the

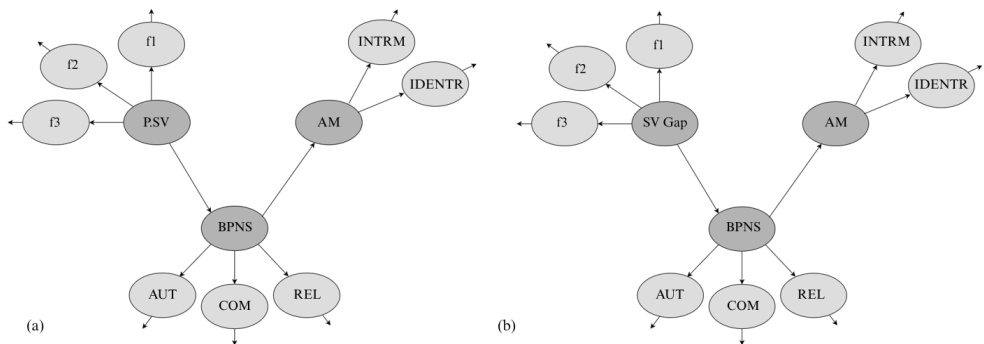


FIGURE 1 Theoretical structural path model. Structural paths of the hierarchical models: (a) the relationship between perceived student voice (P.SV) with basic psychological need satisfaction (BPNS) and autonomous motivation (AM); and (b) the relationship between a gap between students' ideal student voice (I.SV) and perceived student voice (SV gap) with BPNS and AM.

project via a consortium of educational research and practices. In the nine secondary schools, at least two teachers per school joined the project, voluntarily or because they were asked by the school board, for the duration of two years. These teachers participate in learning design studios in which they, under the guidance of researchers and educational professionals, develop and experiment with SV approaches in their classroom. Online student questionnaires were administered by the teachers within the classes they were teaching when they joined the project. Student self-reported data were collected specifically as teachers' perception of teaching has been shown to be incongruent with students' perceptions (Domen et al., 2020). To ensure truthful responses, students were also informed prior to testing that teachers would not receive individual scores although they would receive class-level results. The present study is embedded within the project and makes use of the survey data collected at the end of the first year and start of the second year.

The data collection and management plan for the project was approved by the Ethical Committee of Research of the University of Applied Sciences Utrecht in accordance with the Dutch Code of Conduct for Scientific Integrity. No personal data was acquired, participants were informed about data management, and were able to retract consent at any time. Students, teachers, and parents/guardians of students under the age of 16 were asked to give informed consent, prior to data collection. Partly due to the difficulties of obtaining these, responses varied greatly per class.

Participants

A total of 409 student questionnaires were collected from 18 teachers' classes, 312 at the end of the first school year and 97 at the start of the second school year. Data collected during the second year were only included if the class did not participate during the first year. The participating teachers taught a variety of subjects: history ($n=3$), economics ($n=4$), German ($n=1$), French ($n=3$), English ($n=2$), biology ($n=4$), and mathematics ($n=1$). On average, around 10 of approximately 24 students per class filled in the questionnaire. Data were carefully examined for anomalies, and data with anomalous response patterns (i.e. participants completing all questions with either the same value or with a definitive pattern of values such as alternating two values) were excluded from analysis ($n=14$). Data analysis was therefore conducted on the data from 395 participants. Dutch secondary education uses a tracking system that broadly differentiates between three pathways: pre-vocational education, general secondary education, and pre-university education. The majority of participants ($n=155$) were third-year students (aged 14–15) who followed general secondary and pre-university pathways ($n=326$). Students following pre-vocational pathways were, therefore, underrepresented within the present study. Further demographic data was not available.

Measurement instruments

The questionnaire included three scales measuring basic psychological need satisfaction (BPNS), autonomous motivation (AM), perceived student voice (P.SV) with regard to curriculum components in SV approaches, and ideal student voice (I.SV). A five-point Likert response scale was used for all subscales. Items were translated and/or reformulated to assess how Dutch secondary students feel in their teacher's classroom; for example, 'I am motivated to learn [this subject] because... my teacher expects me to do so'. Any items mentioned within this article have therefore been translated to English. For all latent variables,

descriptive statistics were measured. Model-based internal consistency was assessed using omega hierarchical due to our large sample size and to avoid overestimation, with ω_{ho} representing reliability of the second-order factor measuring the construct and ω_h representing the reliability of the first-order factors; with > 0.50 deemed acceptable and > 0.75 preferred (McNeish, 2018; Watkins, 2017).

Basic psychological need satisfaction

BPNS was measured with three latent indicators, autonomy, competence and relatedness, using the validated Basic Psychological Needs Satisfaction and Frustration Scale (BPNSFS; van der Kaap-Deeder et al., 2020). The BPNSFS includes four items per variable, two of which assess need frustration and two need satisfaction, of which the former were reverse-scored before analysis. For example: 'With this teacher... I feel forced to do things that I wouldn't choose to do myself' was reverse-scored. Students responded to the items on a scale of 1 (completely disagree) to 5 (completely agree). Confirmatory factor analysis revealed insufficient loadings of two items on their corresponding factors; one on relatedness (e.g. '... I feel as if the teacher doesn't care how I feel') and one on competence (e.g. '... I am disappointed in my performances for this subject'). Due to the ambiguity of their formulation in Dutch, both items were omitted from further analysis. Internal consistency was good for competence ($\omega_h = 0.74$) and adequate for autonomy ($\omega_h = 0.60$) and relatedness ($\omega_h = 0.66$). Moreover, reliability of the second-order variable BPNS was good ($\omega_{ho} = 0.75$).

Students within the study generally felt their BPN to be satisfied ($M = 3.70$, $SD = 0.56$), with highest satisfaction for relatedness ($M = 4.05$, $SD = 0.63$), followed by competence ($M = 3.72$, $SD = 0.75$) and autonomy ($M = 3.41$, $SD = 0.67$).

Autonomous motivation

AM was measured with two latent indicators, intrinsic regulation and identified regulation, from the validated Self-Regulation Questionnaire – Academics (SRQ-A; Ryan & Connell, 1989). The SRQ-A measures why students learn by offering motivational reasons for learning, and includes four items per variable (e.g. 'I am motivated to study [this subject] because... I enjoy studying for this subject'). Students responded to the items on a scale of 1 (completely disagree) to 5 (completely agree). Internal consistency was good for both first-order factors of the measurement model (intrinsic: $\omega_h = 0.88$, identified: $\omega_h = 0.74$). Reliability of the second-order variable AM was also good ($\omega_{ho} = 0.81$).

Students felt neutral about whether they felt autonomously motivated ($M = 3.08$, $SD = 0.85$) with a higher mean for identified regulation ($M = 3.32$, $SD = 0.89$) than for intrinsic regulation ($M = 2.84$, $SD = 0.97$).

Student voice approaches

A SV scale was developed in Dutch based on the premise that students' P.SV could vary per component of curriculum design (van den Akker, 2003). The scale measures SV along two parameters: (a) who takes the lead in decision-making, (b) for each component of curriculum design. Thirteen questions were formulated based on the 10 curriculum components (van den Akker, 2003) and students were asked to respond to all items twice—once preceded by the phrase 'Who decides...' to measure P.SV and once

preceded by the phrase 'Ideally, who decides...' to measure students' I.SV. Of the 13 questions, two pertained to content of learning and included the components 'aims and objective' and 'content' (e.g. 'what you learn for this subject'). Four questions pertained to lesson practicalities and included the components 'materials and resources', 'learning activities', and 'grouping' of which the latter was divided into two questions differentiating between the level of difficulty of assignments and the choice of peer-collaboration (e.g. 'with whom you work together for this class'). Two questions pertained to organisation, including the 'time' and 'location' components (e.g. 'where you are studying for this subject'). Lastly, five items pertained to evaluation of learning and included the curriculum component of 'assessment', discriminating between the timing of evaluation, the form of evaluation, the assessment of evaluation, and the weight of an assessment (e.g. 'when you demonstrate mastery of this subject').

Students responded to each item on a scale of 1–5, with possible responses defined as: 1 = 'only the teacher decides', 2 = 'mainly the teacher decides', 3 = 'the teacher and student decide together', 4 = 'mainly the student decides', and 5 = 'only the student decides'. Exploratory factor analysis on the factorial structure perceived student voice resulted in a subset of 10 questions. Three items were omitted from further analysis due to aberrant distribution patterns and inconsistent factor loadings: both items on organisation and one item on evaluation. On consideration, all three items were deemed ambiguously formulated, which may have led to inconsistent data distribution with large standard deviations.

Students perceived low student voice ($M < 3.00$) on nearly all items, meaning that they felt their teacher was in control of curricular decisions, with the exception for decisions concerning with whom they are working (LP4: $M = 3.27$, $SD = 0.93$).

Data analysis

Phase 1: Defining and confirming the measurement models

First, each of the measurement models (P.SV, SV Gap, BPNS, and AM) were defined and confirmed to provide the basis for structural analysis of the relationships between P.SV, BPNS, and AM and between SV Gap, BPNS, and AM.

Confirmatory factor analysis (CFA) was performed on the validated subscales (BPNS and AM) to confirm the factorial structure of the measurement models. As kurtosis was high or low for some items and variables, parameters, standard errors, and mean- and variance adjusted model test statistics were estimated using the robust maximum likelihood estimation to account for non-normality (MLMV; Fabrigar et al., 1999; Kline, 2023). MLMV has been shown to produce accurate estimates, standard errors, and Type 1 errors for normally and non-normally distributed data (Maydeu-Olivares, 2017). Correlations were added between some of the residuals when modifications were meaningful and improved the fit (Byrne, 2012). Goodness of fit was evaluated considering the following indexes and criteria: robust comparative fit index (CFI) > 0.95 (Hu & Bentler, 1999); robust root mean square error of approximation (RMSEA) acceptable at < 0.08 (Awang, 2012) and good at < 0.05 (Byrne, 1994), and (standardised) root mean square residual (SRMR) < 0.08 (Byrne, 1994). As the sample size was considerable (i.e. larger than 350), factor loadings above 0.30 were considered minimally acceptable, although loadings above 0.50 were preferred (Hair et al., 2010). The formulation of items with insufficient factor loadings or that cross-loaded on two or more factors were evaluated on potential ambiguity and removed from further analysis. Convergent validity was assessed with the average variance extracted (AVE), calculated by averaging the squared standardised loadings of the indicators for a factor, with

> 0.50 indicating excellent convergent validity, > 0.40 very good, > 0.30 good, > 0.20 fair, and > 0.10 poor convergent validity (Comrey & Lee, 1992).

CFA on the measurement model BPNS demonstrated adequate fit of the model when correlations were added between the residuals of some pairs of the observed variables χ^2 (28, $n=395$)=47.81, $p=0.01$; CFI=0.97; RMSEA=0.04 [0.02–0.06]; and SRMR=0.04. Factor loadings of the indicators on the first-order factors were above 0.40, and AVE ranged between 0.31 and 0.45, supporting good convergent validity. Factor loadings of the first-order factors on BPNS were > 0.81, and AVE for BPNS was 0.74, supporting excellent convergent validity. CFA on the measurement model AM demonstrated good fit when correlations were added between some of the residuals χ^2 (16, $n=395$)=7.30, $p=0.97$; CFI=1.00; RMSEA=0.00 [0.00–0.00]; and SRMR=0.01. Factor loadings of the indicators on the first-order factors were all significant and exceeded > 0.58. AVE was 0.68 for intrinsic regulation and 0.48 for identified regulation, supporting excellent construct validity. Due to the factorial structure, with one second-order factor (AM) and two first-order factors (intrinsic and identified), intercept parameters for the first-order factors were fixed at 0 and loadings between these two were equated (0.91). AVE for second-order factor AM was 0.83, supporting excellent convergent validity. Based on these indices, the hierarchical measurement models for both BPNS and AM were retained.

For subscale P.SV, exploratory factor analysis (EFA) with Promax rotation was used as extraction method to discern the single layer factorial structure based on our data. The Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity were performed to measure whether data were suitable for factor analysis (Shrestha, 2021). KMO values > 0.6 indicate sampling is appropriate for factor analysis, with > 0.7 indicating adequate sampling (Shrestha, 2021). KMO revealed average-strength partial correlations between variables and Bartlett's test of sphericity was significant, meaning that a proportion of variance between groups of the observed variables were likely due to a common factor (KMO=0.74; χ^2 [4, $n=395$]=531.69, $p<0.01$). Scree plot analysis and parallel analyses, based on principle axis factor analysis, were performed to determine the number of common factors. EFA was performed to analyse the single-layer factorial structure (Fabrigar et al., 1999). Subsequently, CFA was performed to confirm the hierarchical two-layer factorial structure of the measurement model. Once the measurement model was defined and confirmed, paired *t*-tests, with effect size Cohen's *d*, and bivariate Pearson's correlations were calculated between students' P.SV and I.SV. A new variable, student voice gap (SV Gap), was calculated by subtracting P.SV from I.SV. CFA on the measurement model SV Gap was performed to confirm the hierarchical two-layer factorial structure.

Bivariate correlations between all latent variables were calculated with Pearson's correlation coefficient to assess degrees of association.

Phase 2: Structural analysis

In the second phase, structural equation modelling (SEM) was performed (standardised; with MLMV) to determine whether data fit the hypothesised structural model. Structural relationships between the second-order variables (P.SV, SV Gap, BPNS, and AM) were estimated using the measurement models without extra modifications. Variances of the second-order factors were standardised. As control variables could introduce bias to the hypothesised structural model, leading to confounding structural relationships, no control variables were added (Li, 2021). Goodness of global fit was similarly evaluated with χ^2 test, robust CFI, robust RMSEA, and (standardised) SRMR. Local fit was assessed by computing covariances between Bentler's standardised residuals. Goodness of fit was evaluated by examining the number of covariances exceeding 0.10 (Kline, 2023).

RESULTS

Differentiating student voice approaches by curriculum components

As suggested by scree-plot analysis and parallel analysis, EFA on our data revealed best fit on a three-factor structure accounting for 33% of cumulative variance with good fit measures: χ^2 (18, $n=395$) = 23.70, $p=0.17$; CFI = 0.99; RMSEA = 0.03 [0.00–0.06]; and SRMR = 0.03. Factors largely corresponded to our conjectured variables of content, lesson practicalities (LP), and evaluation. However, contrary to our assumption, LP3 (e.g. ‘... how difficult the assignments are in class’) loaded on factor content. It stands to reason that difficulty of assignments may be more closely related to learning content than to lesson practicalities. Moreover, CFA on the hierarchical measurement model demonstrated good fit of the model when correlations were added between some of the residuals: χ^2 (28, $n=395$) = 29.16, $p=0.41$, CFI = 0.99, RMSEA = 0.01 [0.00–0.04], and SRMR = 0.04. Significant loadings of the indicators on the second-order variable were only found for LP (0.50, $p<0.01$) and evaluation (0.56, $p<0.001$) but not for content, despite its high loading (0.91, $p=0.16$). Internal consistency was good for evaluation ($\omega_h=0.77$) and adequate for lesson practicalities ($\omega_h=0.69$) and content ($\omega_h=0.63$). AVE for all three factors was above 0.34, supporting good convergent validity (Comrey & Lee, 1992). Reliability of the second-order factor SV was low but above cut-off ($\omega_{ho}=0.55$; Watkins, 2017) and AVE was 0.80.

Of the three approaches, students perceived having the most SV about lesson practicalities (e.g. lesson activities and assignments, sources and materials being used, and grouping; $M=2.83$, $SD=0.73$), followed by evaluation (e.g. when and how students demonstrate mastery and assessment of progress; $M=2.70$, $SD=0.71$) and content ($M=2.83$, $SD=0.73$) respectively (see Table 1).

The student voice gap (SV Gap) variable was calculated by subtracting perceived SV (P.SV) from ideal SV (I.SV). CFA on the hierarchical measurement model SV Gap demonstrated good fit of the model when correlations were added between the residuals of one pair of observed variables χ^2 (31, $n=395$) = 32.70, $p=0.38$, CFI = 0.99, RMSEA = 0.01 [0.00–0.04], and SRMR = 0.04. The same as for the measurement model P.SV, significant loadings of the indicators on the second-order variable were only found for Gap lesson practicalities (G.LP; 0.74, $p<0.01$) and Gap evaluation (G.evaluation; 0.72, $p<0.01$) but not for Gap content (G.content), despite its high loading (0.96, $p<0.40$). Internal consistency was acceptable for G.evaluation ($\omega_h=0.49$) and adequate for G.lesson practicalities ($\omega_h=0.60$) and G.content ($\omega_h=0.51$). AVE ranged between 0.22 and 0.33 supporting fair to good convergent validity (Comrey & Lee, 1992). Reliability of the second-order factor SV Gap was acceptable ($\omega_{ho}=0.61$; Watkins, 2017) and AVE was 0.67, supporting excellent convergent validity. Descriptive statistics, results of t-tests, and correlations for these variables are summarised in Table 2. Significant positive correlations between perceived SV and ideal SV were found for all curriculum component variables and individual items. In other words, how much SV students perceived themselves to have was related to how much SV they ideally wanted ($r=0.55$, $p<0.001$), generally wanting significantly more SV about curricular decisions within the classroom than they currently had ($t=0.93$, $p<0.001$, $d=0.25$). Students wanted the most SV, and the greatest increase in SV, for decisions concerning lesson practicalities, preferring collaborative decision-making favouring their input. Furthermore, although students wanted more SV about content than they perceived themselves to currently have, they preferred the teacher to take the lead. In contrast, students did not wish for more SV about evaluation, preferring the teacher to take the lead.

TABLE 1 Exploratory factor analysis for perceived students voice (P.SV).

Items were preceded by the phrase: 'At this moment, who decides...'	M	SD	S	K	Factor		
					1	2	3
Factor 1: Content	2.34	0.72	0.15	-0.34			
C1 ... with which learning objectives you are working	2.57	0.98	0.24	-0.44	0.53		
C2 ... what you want to learn for this subject	2.27	1.07	0.62	-0.49	0.80		
LP3 ... how difficult the assignments are in class	2.18	0.86	0.51	-0.04	0.34		
Factor 2: Lesson Practicalities	2.83	0.73	0.15	0.16			
LP1 ... which materials you are using in class (e.g. methods, computer, sources, etc.)	2.30	1.03	0.60	-0.17		0.57	
LP2 ... how you are learning (e.g. what assignments or activities you do in class)	2.91	1.20	0.09	-0.90		0.70	
LP4 ... with whom you work together for this class	3.27	0.93	-0.22	-0.20		0.33	
Factor 3: Evaluation	2.70	0.71	0.07	-0.15			
E1 ... whether you have mastered the subject and/or how far you are towards mastery	2.86	0.91	-0.06	-0.09			0.47
E2 ... in what way you demonstrate mastery of this subject (form of assessment: e.g. oral exam, test, presentation, etc.)	2.33	1.08	0.38	-0.69			0.36
E3 ... when you demonstrate mastery of this subject	2.68	1.08	0.15	-0.68			0.91
E4 ... how well you are doing the assignments for this subject	2.92	1.05	0.09	-0.73			0.41
Mean Perceived SV	2.63	0.52	-0.11	0.24			

Note: $n=395$. Items were presented in Dutch and are translated to English. Possible values ranged from 1 to 5; with 1 indicating teacher-led and 5 indicating student-led. The extraction method was exploratory factor analysis using a Promax (with MLMV) rotation.

Abbreviations: K, Kurtosis; S, skewness.

The relationship between various approaches with need satisfaction and autonomous motivation

Bivariate relationships

Bivariate Pearson correlations were calculated between all latent variables to examine linear relationships (see Tables 3a and 3a). Perceived SV was positively related to BPNS ($r=0.25$, $p<0.001$) and BPNS was positively related to AM ($r=0.52$, $p<0.001$). Increases in SV approaches were particularly related to increased satisfaction of autonomy, with low to medium strength. A direct relationship between perceived student voice and AM was also found, albeit a weak one.

However, correlations suggest that not all approaches equally predicted need satisfaction and AM. Data showed the strongest correlations between approaches regarding content

TABLE 2 Descriptive statistics and analytic results for perceived student voice (P.SV), ideal student voice (I.SV), and a gap between ideal and perceived student voice (SV GAP).

	P.SV		I.SV		SV GAP									
	M		M		SD	S	K	t (394)	d	M	SD	S	K	r (393)
Content	2.34		2.52		0.80	0.16	0.01	4.58***	0.23	0.18	0.79	0.62	2.37	0.47 ***
C1	2.57		2.53		1.06	0.15	-0.77	-0.76	-0.04	-0.04	1.13	0.03	0.38	0.39***
C2	2.27		2.63		1.05	0.19	-0.48	5.80***	0.30	0.36	1.22	0.07	1.33	0.34***
LP3	2.18		2.41		1.01	0.37	-0.29	4.87***	0.24	0.23	0.95	0.57	0.66	0.49***
LP	2.83		3.06		0.80	-0.03	-0.13	6.27***	0.32	0.24	0.75	0.45	1.44	0.52***
LP1	2.30		2.69		1.11	0.16	-0.63	7.63***	0.38	0.39	1.02	0.23	1.89	0.55***
LP2	2.91		3.03		1.15	-0.07	-0.75	1.72	0.08	0.11	1.31	0.04	2.27	0.37***
LP4	3.27		3.48		0.99	-0.39	-0.15	4.67***	0.24	0.21	0.89	0.09	2.64	0.57***
Evaluation	2.70		2.72		0.77	-0.14	-0.18	0.72	0.03	0.02	0.68	-0.02	2.47	0.59***
E1	2.86		2.75		0.95	-0.04	-0.18	-2.14*	-0.11	-0.11	1.04	-0.23	0.64	0.38***
E2	2.33		2.50		1.03	0.16	-0.56	2.94***	0.15	0.17	1.15	0.09	0.65	0.41***
E3	2.68		2.71		1.02	0.05	-0.47	0.42	0.02	0.02	1.09	0.04	1.44	0.46***
E4	2.92		2.94		0.99	0.05	-0.40	0.34	0.02	0.02	1.02	-0.09	0.87	0.50***
Mean total	2.63		2.77		0.62	-0.14	0.30	4.93***	0.25	0.14	0.55	1.12	3.87	0.55***

Note: n = 395. Possible values ranged from 1 to 5; with 1 indicating teacher-led and 5 indicating student-led. SV GAP: difference between I.SV and P.SV, the latent variables are in grey.
*p < 0.05; **p < 0.01; ***p < 0.001; r ≥ 0.5 in bold.
Abbreviations: K, Kurtosis; S, skewness.

TABLE 3A Bivariate Pearson correlations between autonomous motivation (AM), basic psychological need satisfaction (BPNS), and perceived student voice (P.SV).

	1. AM	1.1.	1.2.	2. BPNS	2.1.	2.2.	2.3.	3. P.SV	3.1.	3.2.	3.3.
1. AM	–										
1.1. Intrinsic	0.92***	–									
1.2. Identified	0.91***	0.67***	–								
2. BPNS	0.52***	0.50***	0.45***	–							
2.1. Autonomy	0.42***	0.39***	0.37***	0.83***	–						
2.2. Competence	0.45***	0.45***	0.36***	0.81***	0.48***	–					
2.3. Relatedness	0.41***	0.38***	0.36***	0.79***	0.51***	0.49***	–				
3. P.SV	0.14**	0.13**	0.13*	0.25***	0.33***	0.13**	0.14**	–			
3.1. Content	0.12*	0.10*	0.11*	0.22***	0.32***	0.09	0.11*	0.73***	–		
3.2. Lesson Practicalities	0.07	0.09	0.04	0.13**	0.19***	0.06	0.08	0.66***	0.30***	–	
3.3. Evaluation	0.11*	0.09	0.12*	0.19***	0.21***	0.13**	0.12*	0.76***	0.35***	0.20***	–

Note: $n = 196$; $p < 0.001$; $r > 0.3$ in bold.

and BPNS, despite students' perception of having little SV about content, followed by evaluation and lesson practicalities, respectively. What is more, of the three SV variables, only evaluation correlated positively, but weakly, with all three needs. Significant, albeit weak, linear relationships between SV approaches and AM were only found for content and evaluation, but not for lesson practicalities. In short, although increasing SV in all three approaches predicts need satisfaction to some degree, a moderate correlation was only found between content-based approaches and satisfaction of the need for autonomy.

Furthermore, a negative correlation between SV Gap and BPNS was found ($r = -0.13$, $p < 0.05$; see Table 3b). More specifically, this relationship was strongest for autonomy ($r = -0.18$, $p < 0.001$). In other words, a gap between perceived and ideal SV, to such an extent that students had less SV than they wanted about curricular decisions, predicted a decrease in BPNS, particularly for autonomy.

The structural relationship between various approaches with need satisfaction and autonomous motivation

The hierarchical structural model consisted of three second-order factors with a combined total of eight first-order factors; P.SV with three indicators, BPNS with three indicators, and AM with two indicators. Although factorial analysis of the measurement model student voice revealed non-significant factor loading of the indicator content on P.SV, it was retained in the structural model due to its strength of association with BPNS and AM. The model consisted of 11 latent variables with 28 observed variables, estimating 77 model parameters and was over-identified. Thus, both latent indicators of second-order factor AM were allowed to move freely. Modifications were only added in accordance with the factorial analysis and consisted solely of correlations between the residuals of measurement variables within their first-order factor. The final model is presented in Figure 2.

Structural equation modelling (SEM) demonstrated good global fit of the data to the model: χ^2 (329, $n = 395$) = 368.64, $p = 0.07$; CFI = 0.98; RMSEA = 0.03 [0.00–0.04]; and SRMR = 0.05. Covariances between the residuals of observed variables were near 0 and below 0.11 for all but seven pairs of observed variables with covariances between 0.11 and 0.22 (see Appendix A). Factor loadings on all second-order factors (P.SV, BPNS, AM) were significant and above 0.51. As global fit was good and local fit was acceptable, the model was retained.

The results supported our hypotheses that perceived SV about curricular decisions is positively related to satisfaction of BPN ($\beta = 0.36$, $p < 0.001$); and that BPNS is positively related to AM ($\beta = 0.64$, $p < 0.001$; see Figure 2). In other words, increasing SV about curricular decisions within the classroom supports need satisfaction and need satisfaction supports students' AM.

The relationship between not adapting approaches to students' ideal SV with BPNS and AM

Good fit was also found when replacing SV with SV Gap in the structural model: χ^2 (332, $n = 395$) = 340.38, $p = 0.36$; CFI = 0.99; RMSEA = 0.01 [0.00–0.03]; and SRMR = 0.04. Of the covariances between the residuals, only seven pairs exceeded the 0.10 threshold, ranging between 0.11 and 0.15 (see Appendix B). Factor loadings on the second-order factors BPNS and AM were significant and above 0.79. However, G.content did not demonstrate a significant loading on SV.GAP. As global and local fit were acceptable, the model was retained. Results showed that an increase in SV Gap was negatively related to satisfaction of BPN ($\beta = -0.15$, $p < 0.05$; see Figure 3) although this was not as strong as the relationship found between P.SV and BPNS. In the second structural model, BPNS was also positively related

TABLE 3B Bivariate Pearson Correlations between autonomous motivation (AM), basic psychological need satisfaction (BPNS), and perceived student voice gap (SV GAP).

	1. AM	1.1	1.2	2. BPNS	2.1	2.2	2.3	4. SV GAP	4.1	4.2	4.3
4. SV GAP	-0.10	-0.10*	-0.07	-0.13*	-0.18***	-0.02	-0.10*	—			
4.1 G. Content	-0.05	-0.05	-0.04	-0.10*	-0.18***	0.01	-0.06	0.76***	—		
4.2 G. Lesson practicalities	-0.08	-0.08	-0.05	-0.06	-0.06	0.01	-0.06	0.72***	0.40***	—	
4.3 G. Evaluation	-0.09	-0.10	-0.07	-0.13*	-0.16**	-0.04	-0.10	0.75***	0.34***	0.27***	—

Note: n = 395; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; / $p > 0.3$ in bold.

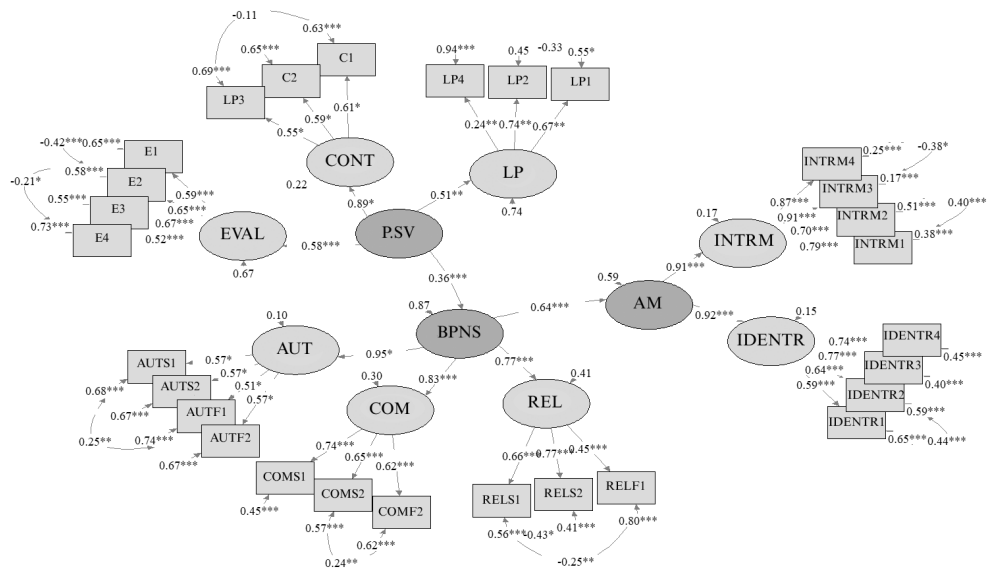


FIGURE 2 Structural equation modelling for the path model. $n=395$. The extraction method was structural equation modelling (with MLMV and standardised estimations). * $p<0.05$; ** $p<0.01$; *** $p<0.001$.

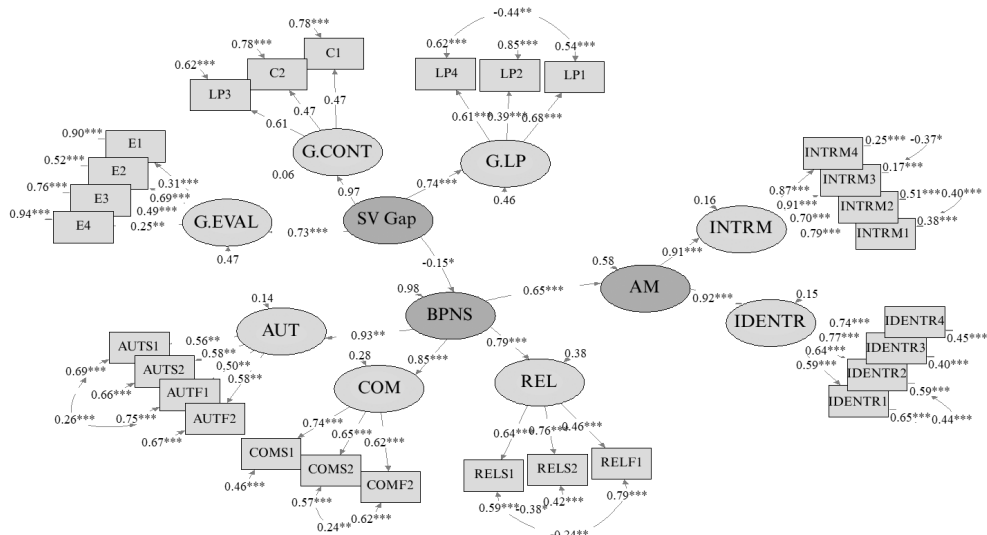


FIGURE 3 Structural equation modelling for the path model with SV Gap. $n=395$. The extraction method was structural equation modelling (with MLMV and standardised estimations). * $p<0.05$; ** $p<0.01$; *** $p<0.001$.

to AM ($\beta=0.64$, $p<0.001$). In short, the larger the gap between P.SV and ideal SV about curriculum components, the less students' psychological needs were satisfied.

DISCUSSION

Increasing student voice (SV) has been gaining popularity in both research and practice as a promising change initiative to address the prevalent motivational issues in

secondary education (Conner et al., 2022; Kahne et al., 2022; Mitra & Gross, 2009; Reeve & Cheon, 2021). Despite being a promising strategy, little is known about how SV approaches and their effects may vary. The present study aimed to gain insight into the relationship between SV approaches and students' need satisfaction and autonomous learning motivation. More specifically, the present study aimed to explore whether SV approaches and their relationship with students' need satisfaction and learning motivation vary according to the curriculum components about which students perceive to have and want to have SV.

Findings suggest that SV approaches can be differentiated in terms of three categories of curriculum components (van den Akker, 2003): content (i.e. learning objectives, learning content, and difficulty of learning content), evaluation (i.e. mastery, planning, form of assessment, and evaluation of learning progress), and lesson practicalities (i.e. learning activities, grouping, and use of materials). Considerable differences were found between these approaches in how much SV students perceived themselves to have. Students felt that SV approaches were mainly aimed at the more practical curricular decisions, particularly at those regarding learning activities and grouping, but also the evaluation of their learning progress. Although students perceived themselves to have little SV, they ideally wanted more, especially about the more practical components. Crucially, how much SV they perceived themselves to have predicted how much SV they wanted to have. These findings are in line with our hypothesis, based on previous findings, that students tend to want influence on superficial structural components of curriculum design and not the more cognitive components (Stefanou et al., 2004).

Our findings solidify research on the benefits that SV approaches have for students' BPN and AM to learn. The more SV students perceived themselves to have about curricular decisions, the greater their need satisfaction, particularly for autonomy (Conner et al., 2022; Kahne et al., 2022). Furthermore, need satisfaction was strongly related to AM, in line with self-determination theory and previous studies (Bureau et al., 2022; Deci & Ryan, 2002; Shernoff et al., 2003). In other words, implementing SV approaches within the classroom is an advantageous strategy for supporting satisfaction of students' BPN, which in turn supports their AM.

Critically, not all SV approaches were equally associated with need satisfaction and AM. Findings suggest that SV about content was most strongly related to students' need for satisfaction of autonomy, competence, and relatedness. Concerningly, SV about lesson practicalities was least associated with need satisfaction, despite students perceiving and wanting most SV about these practical components. Students' disinclination to have considerably more SV about content and evaluation may inadvertently be caused by the teachers' focus on the more superficial procedural or organisational components, thereby hindering students' focus on cognitive components (Stefanou et al., 2004). When students are given opportunities for student voice in the classroom it is usually about superficial components, and that may limit their own perception of what the boundaries of their voice should be.

Importantly, when approaches did not correspond to students' wishes for SV, resulting in a gap between perceived SV and ideal SV with ideal greater than perceived, need frustration was found, most notably autonomy frustration. SV approaches that do not adapt to students' needs are susceptible to tokenism when they do not correspond with students' goals, values or interests, or when students feel like having influence is futile due to curricular or institutional constraints (Fielding, 2001; Roth et al., 2007). It may appear as if students have a voice, but students do not actually feel heard, as their needs are not taken into account (Fielding, 2001). Consequently, students may have negative attitudes towards SV, resist SV initiatives, and demotivate their teachers to continue SV efforts (Basri, 2023; Reeve & Cheon, 2021). In contrast, SV initiatives that are principally focused on students' voices may lead to the positive experiences for students and teachers that are needed to continue SV

efforts (Basri, 2023; Fielding, 2001; Little, 2007). Hence, it stands to reason that adopting SV approaches involving students in decisions about the curriculum components they wish to have influence on may be more important than implementing what might seem to be a more effective, evidence-based approach that was evaluated with other students in different contexts.

Given that students who perceived more SV also wanted more SV, it seems conceivable that SV and the wish for SV are malleable when students have positive SV experiences (Basri, 2023; Mitra & Gross, 2009). Indeed, it seems unlikely that students are instantly ready to take the lead on curricular decisions within the classroom, but need teacher guidance to gradually gain and want more control of their education, particularly for the more cognitive curriculum components related to content and/or evaluation (Fielding, 2001; Little, 2007; Mitra, 2004). Similar observations have been reported regarding students' receptiveness to autonomy-supportive teaching, which was substantially influenced by their previous learning experiences and was shown to be malleable when teachers provided proper scaffolding (Basri, 2023; Reeve & Cheon, 2021). Likewise, children's agency has been shown to emerge and evolve within the situational and relational context rather than being an innate property ready to be used when given permission (Papadopoulou & Sidorenko, 2022).

Scaffolding requires notable teacher skills to support students in performing within a zone of proximal development that they cannot yet reach by themselves, and thereafter to gradually transfer responsibility for the learning task to students (Vygotsky, 1978). Moreover, it requires providing structure, setting clear expectations and continuously guiding reflective interaction with students to assess their progress, concurrent with supervision, negotiation, and gentle intervention when students go off-course (Little, 2007; Papadopoulou & Sidorenko, 2022; Vansteenkiste et al., 2012; Vieira, 2009). It also requires differentiation of approaches, as students' zone of proximal development for SV is likely not homogeneous (Toshalis & Nakkula, 2012; Vieira, 2009). Consequently, SV approaches may need to vary greatly between classes and between students (Toshalis & Nakkula, 2012).

SV approaches that strike a balance between listening to students' voices and challenging students to gradually gain more SV, especially about content, could prove to be most advantageous for students' need satisfaction and learning motivation. Previous research has similarly demonstrated that most learning occurs when students feel both supported and challenged by their teachers (Lee & Smith, 1999). The effectiveness of implementing SV approaches therefore critically depends on teachers' commitment to increasing SV within their classroom, their capability to offer support and challenges, and, for genuine SV, their readiness to hand over control (Little, 2007; Reeve & Cheon, 2021; Vansteenkiste et al., 2012; Vieira, 2009). To quote Vieira (2009, p. 269): 'the pedagogy for autonomy dream will only come true when it becomes the teachers' dream'.

However, while SV may challenge the existing relational and situational power-dynamics, it is also paradoxically shaped by the complex educational context in which the students and teachers reside (Papadopoulou & Sidorenko, 2022). Teachers committed to increasing SV may be restricted and pressured by curricular demands, institutional values or practices, or performance evaluations (Basri, 2023; Reeve & Cheon, 2021; Rudduck & Fielding, 2006; Vieira, 2009). Indeed, autonomy-supportive working environments inspire autonomy-supportive teachers, committed to SV initiatives that in turn stimulate student autonomy (Basri, 2023; Fielding & Rudduck, 2002; Ryan & Deci, 2020). Schools that recognise students and teachers as stakeholders are devoted to SV, and create opportunities for developing identity, foster a democratic culture that facilitates the implementation and longevity of SV initiatives (Rudduck & Fielding, 2006). To add to Vieira's previous quote (2009): the teachers' dream for SV may only come true when it becomes the institutions' dream.

Limitations

The present study, and its findings, have some limitations. Firstly, our exploration was limited by the nature of quantitative data analysis and the use of a non-validated scale. For the measurement model P.SV, the same sample was used for both EFA and CFA to understand the hierarchical factorial structure. Although combining these two is considered to be a rigorous and holistic approach in understanding and defining optimal factor structure, doing so hinders cross-validation of the results (Schmitt et al., 2018). More research is needed to validate both the scale and the results. Furthermore, despite good model fit, only 0.33 of cumulative variance was explained by our model, thus leaving room for other variables. Both items on organisational curriculum components were omitted from the analysis due to ambiguity, but organisation could very well be a fourth category that differentiates approaches. What is more, the present study did not examine whether the benefits of SV may vary depending on the activities or instruments of SV approaches (e.g. surveys, dialogue, offering choices, etc.). Further exploration is needed to ascertain whether approaches may also vary according to other, as of yet undetermined, factors and whether approaches vary per subject or pathway. In addition, factor loadings and internal consistency of the measurement model SV Gap, particularly of factors G.content and G.evaluation, were not optimal. Given that CFA on the measurement model demonstrated good model fit and little quantitative research on SV within the classroom had been done before, the model was retained in this explorative study and was deemed strong enough for structural analysis. The present study contributes to future research on a validated instrument able to measure SV approaches, and their variety, within the classroom.

Secondly, as data were collected at the beginning of the project, teachers and students could have been struggling with experimenting, developing, and implementing SV approaches. Future longitudinal research may shed light on students' and teachers' learning curve for SV and the limitations of implementing SV approaches.

Practical implications

Definitions of SV approaches, their variety, and the benefits that various approaches have for students' need satisfaction and learning motivation are crucial for effective practical implementation of them. The findings of this study demonstrate that increasing SV is a promising strategy to support satisfaction of students' BPN and AM within the classroom, with approaches related to content leading to the most benefits. However, we would like to reiterate that it may prove to be more valuable to listen to students' voices, fostering positive SV experiences for students and teachers, rather than implementing more effective, evidence-based approaches evaluated with other students in different contexts.

SV approaches that strike a balance between listening to students' voices and challenging students to gradually gain more SV about content may prove to be most advantageous for students' need satisfaction and learning motivation. We would encourage, perhaps redundantly and self-evidently, beginning SV initiatives by listening to students' voices.

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CONFLICT OF INTEREST STATEMENT

We have no conflicts of interest to disclose.

DATA AVAILABILITY STATEMENT

The Ethical Committee does not allow data of minors to be publicly available.

ETHICS STATEMENT

The data collection and management plan for the project was approved by the Ethical Committee of Research of the University of Applied Sciences Utrecht in accordance with the Dutch Code of Conduct for Scientific Integrity. The Ethical Committee does not allow data of minors to be publicly available. This study was not preregistered.

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APPENDIX A

Covariance matrix of the residuals in model 1: The relationship between perceived student voice, satisfaction of needs, and autonomous motivation

AUT_		REL_				COM_				CONT				LP				EVAL				INTRM				IDENTR			
S1	S2	F1	F2	S1	S2	F1	S2	S1	S2	F2	C1	C2	LP3	LP1	LP2	LP4	E1	E2	E3	E4	1	2	3	4	1	2	3	4	
AUTS1																													
AUTS2		-																											
AUTF1		-0.03		-																									
AUTF2		0.00		0.07																									
RELS1		0.07		-0.03		0.03		0.02																					
RELS2		-0.01		-0.01		0.03		-0.03		0.00		-																	
RELF1		-0.01		-0.02		-0.06		0.05		0.00		0.00		-															
COMS1		0.00		0.06		-0.04		-0.04		-0.01		0.01		-0.01		-													
COMS2		-0.03		0.02		-0.06		-0.04		-0.07		0.01		0.05		0.01		-											
COMF2		-0.04		0.02		-0.03		0.03		-0.07		0.08		0.11		-0.01		0.00		-									
C1		0.08		0.00		0.12		0.02		0.00		-0.04		-0.04		-0.01		-0.03		-0.04		-							
C2		0.10		0.00		0.15		0.05		0.05		-0.05		-0.10		-0.05		-0.06		-0.07		0.02		-					
LP3		0.09		0.00		0.14		0.02		-0.01		-0.02		-0.07		-0.03		-0.05		-0.07		0.00		-0.02		-			
LP1		0.06		0.03		0.06		0.03		0.00		-0.09		0.03		-0.09		-0.07		-0.04		0.03		-0.04		0.03		-	
LP2		0.05		0.03		0.01		0.03		-0.03		0.01		0.00		-0.06		-0.07		-0.03		-0.03		-0.06		0.08		0.00	
LP4		0.09		0.02		0.06		-0.02		-0.01		-0.04		0.02		0.01		0.03		0.02		-0.03		0.02		-0.01		0.01	
E1		0.07		0.05		0.07		0.08		0.02		0.07		0.02		-0.01		0.07		0.07		-0.05		0.00		0.00		-0.07	
E2		0.08		0.02		0.00		-0.04		0.03		-0.01		-0.04		-0.09		-0.01		-0.01		0.04		0.08		-0.04		0.07	
E3		0.07		0.03		-0.02		-0.07		0.02		-0.03		-0.06		-0.04		0.07		0.00		-0.03		0.08		-0.02		-0.03	
E4		0.08		0.05		0.13		-0.03		0.01		-0.03		-0.03		-0.02		0.05		-0.04		-0.06		-0.03		-0.01		0.06	
INTRM1		-0.06		-0.03		0.05		0.05		0.05		0.00		-0.05		0.05		0.09		0.04		-0.07		-0.02		0.03		-0.09	
INTRM2		-0.01		0.00		0.00		0.02		0.08		0.04		-0.01		0.04		0.16		0.05		-0.08		0.00		0.08		-0.04	
INTRM3		-0.02		-0.05		-0.03		-0.01		-0.01		-0.02		0.00		0.04		0.08		0.02		-0.09		-0.04		-0.01		-0.06	
INTRM4		-0.04		-0.03		-0.02		0.01		0.01		-0.02		-0.03		0.01		0.08		0.02		-0.07		-0.05		0.00		-0.06	
IDENTR1		0.01		0.09		0.01		0.02		0.01		0.07		-0.04		0.09		0.09		-0.02		-0.04		-0.08		0.03		-0.11	
IDENTR2		0.00		0.09		0.02		0.01		0.06		0.00		-0.02		0.02		0.03		-0.07		-0.01		0.00		0.03		-0.05	
IDENTR3		-0.09		-0.04		-0.10		0.02		0.04		0.00		-0.03		-0.04		-0.03		-0.06		-0.02		-0.05		0.01		-0.07	
IDENTR4		0.00		-0.03		0.00		-0.03		0.02		-0.01		0.00		0.07		0.07		-0.03		-0.07		0.02		0.05		-0.22	

APPENDIX B

Covariance matrix of the residuals in model 2: The relationship between SV GAP, satisfaction of needs, and autonomous motivation

AUT_		REL_				COM_				G.CONT				G.LP				G.Eval				INTRM				IDENTR			
S1	S2	F1	F2	S1	S2	F1	F2	S1	S2	F1	F2	C1	C2	LP3	LP1	LP2	LP4	E1	E2	E3	E4	1	2	3	4	1	2	3	4
AUTS1	-																												
AUTS2	0.00	-																											
AUTF1	0.00	-0.03	-																										
AUTF2	-0.01	0.00	0.07	-																									
RELS1	0.08	-0.02	0.04	0.03	-																								
RELS2	0.00	-0.01	0.03	-0.03	0.00	-																							
REL F1	-0.01	-0.02	-0.06	0.05	0.00	0.00	-																						
COMS1	0.01	0.06	-0.03	-0.04	-0.01	0.00	-0.02	-																					
COMS2	-0.02	0.02	-0.06	-0.04	-0.07	0.00	0.04	0.01	-																				
COMF2	-0.04	0.02	-0.03	0.03	-0.08	0.07	0.10	-0.01	0.00	-																			
C1	-0.03	0.01	-0.08	-0.05	0.01	-0.03	0.02	0.02	0.01	0.07	-																		
C2	-0.04	-0.01	-0.09	-0.07	-0.08	0.02	0.04	0.06	0.04	0.08	0.05	-																	
LP3	-0.04	-0.05	-0.10	-0.08	0.00	0.05	0.00	0.03	0.06	0.06	-0.02	0.00	-																
LP1	0.04	-0.07	-0.04	0.00	0.00	0.04	0.00	0.10	0.01	0.00	-0.01	0.04	0.00	-															
LP2	0.04	-0.04	0.04	0.03	0.00	-0.12	0.03	0.02	0.01	-0.02	0.03	0.04	0.01	0.02	-														
LP4	-0.03	-0.03	-0.03	0.07	-0.02	0.04	0.03	0.05	0.05	0.05	-0.04	-0.07	0.03	0.00	-0.02	-													
E1	0.00	-0.05	-0.06	-0.11	-0.01	-0.11	-0.02	0.00	-0.01	-0.04	0.00	-0.05	0.00	-0.09	0.07	0.02	-												
E2	-0.04	-0.09	-0.04	-0.03	-0.02	0.01	0.03	0.08	0.04	0.03	0.05	-0.01	0.01	-0.01	-0.06	0.06	-0.05	-											
E3	-0.06	-0.09	0.00	-0.04	-0.10	0.03	0.04	0.02	0.02	-0.02	0.02	0.02	-0.08	-0.07	-0.08	0.00	0.08	0.01	-										
E4	-0.03	-0.02	-0.07	-0.03	-0.06	0.04	-0.05	0.03	-0.01	-0.03	-0.04	-0.04	0.02	0.05	-0.07	0.06	0.09	-0.05	0.02	-									
INTRM1	-0.05	-0.03	0.06	0.05	0.05	0.00	-0.06	0.05	0.08	0.03	0.03	-0.08	-0.09	-0.01	-0.07	-0.03	-0.08	-0.06	-0.04	-0.06	-								
INTRM2	0.00	0.00	0.01	0.02	0.08	0.03	-0.01	0.03	0.15	0.04	0.14	-0.02	-0.03	-0.03	-0.06	-0.03	-0.07	0.01	0.04	-0.06	0.00	-							
INTRM3	-0.01	-0.05	-0.02	-0.01	-0.01	-0.03	-0.01	0.03	0.07	0.01	0.11	-0.02	0.00	0.06	-0.08	0.00	-0.03	-0.01	0.00	0.00	0.01	0.00	-						
INTRM4	-0.03	-0.03	-0.01	0.01	0.01	-0.03	-0.04	0.00	0.07	0.01	0.04	0.02	-0.02	0.01	-0.07	-0.02	-0.04	-0.12	-0.01	-0.04	0.00	0.00	0.00	-					
IDENTR1	0.02	0.09	0.02	0.02	0.01	0.06	-0.05	0.09	0.09	-0.03	0.05	-0.02	-0.03	0.05	-0.04	-0.02	-0.05	0.02	0.03	-0.03	-0.01	0.00	0.00	-0.01	-0.04	-			
IDENTR2	0.01	0.09	0.03	0.01	0.06	0.00	-0.03	0.01	0.03	-0.07	0.04	-0.07	-0.09	-0.03	-0.05	-0.03	-0.03	-0.05	-0.03	-0.03	-0.03	0.01	0.00	-0.02	-0.01	0.00	-		
IDENTR3	-0.08	-0.04	-0.09	0.02	0.04	0.00	-0.04	-0.05	-0.04	-0.07	0.07	0.05	0.00	0.06	-0.05	-0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.01	0.04	-0.01	0.00	-	
IDENTR4	0.01	-0.03	0.01	-0.03	0.02	-0.01	0.00	0.06	0.06	-0.03	0.11	-0.03	-0.01	0.13	0.02	-0.08	-0.04	-0.02	-0.02	-0.03	-0.05	-0.03	0.01	0.00	0.02	0.01	0.00	0.02	-0.01