



## Research paper

# The role of teachers' conception of students' intelligence, self-efficacy and need frustration and satisfaction in shaping tendencies in teaching practices

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## ABSTRACT

The present study investigates the influence of teachers' beliefs and personal factors on teaching practices by conducting two studies on their relationship (Study 1) and on the creation of teachers' profiles (Study 2). Data were collected on 447 Italian teachers (85 % female, mean age: 38.7 years, SD:  $\pm 4.49$ ). Path analysis of Study 1 showed that teachers' beliefs significantly influenced their self-efficacy and their perception of teaching practices. The two-way cluster analysis of Study 2 showed two distinct profiles: constructive and didactic. Findings suggest that intervention programs should enhance teachers' self-efficacy and satisfaction to foster more supportive and student-oriented teaching practices.

## 1. Introduction

Over the past 30 years, educational research has sought to understand some teachers' tendency to adopt a more constructivist teaching practices, while others tend to be more directive. This research question becomes important when considering that teaching practices are crucial for student learning and development (e.g., Kikas et al., 2014; Perry et al., 2007). Specifically, literature distinguishes between teacher and student-oriented teaching practices deriving from classroom climate, teachers' classroom management, and instructional quality (Stipek & Byler, 2004). The teacher-centered practice is grounded in behaviourism and traditional learning theories (Stipek, 2004; Stipek & Byler, 2004). It assumes that the teacher should exert absolute control (Reeve & Cheon, 2021) and emphasises learning facts and procedural knowledge (Stipek & Byler, 2004), developing discrete skills, giving all students the same tasks without personalising them in the light of each student's academic skills and individual needs (Pakarinen et al., 2024). In contrast, student-oriented teaching practices are rooted on sociocultural theory (Vygotsky, 1978), which acknowledges the active role of students in constructing their knowledge. These practices emphasize the active role of students in instructional conversations, critical thinking, personalised students' learning goals and students' autonomy promotion (Lerkanen et al., 2016; Stipek & Byler, 2004). Additionally, they provide meaningful peer interactions, supporting the development of social skills and enhancing students' achievement (Stipek & Byler, 2004).

Several studies have investigated the impact of the two teaching

practices on academic skills development (e.g., Lerkanen et al., 2016; Pakarinen & Kikas, 2019; Perry et al., 2007; Tang, Kikas et al., 2017). However, recent studies observed that the effectiveness of both practices is influenced by students' characteristics, such as their proficiency, cognitive factors and self-efficacy (for a review, see de Jong et al., 2023), showing both strengths and weaknesses.

### 1.1. Evidence of the influence of personal factors on teaching practices

According to the Self-Determination Theory (SDT; Deci & Ryan, 2000), when teachers' basic psychological needs are satisfied, teachers are more likely to feel positive emotions, engage in motivational-driven behaviours, experience a greater sense of well-being (e.g., Martela & Sheldon, 2019), and adopt supportive teaching strategies (Moè et al., 2022; Stebbings et al., 2011). Consequently, students can successfully manage their study process and feel competent to achieve academic objectives and outcomes, increasing their motivation and engagement in self-regulated learning. Indeed, meeting basic psychological needs is essential for fostering a teacher's intrinsic motivation, and as a result, they tend to adopt supportive behaviours toward students (Matosic et al., 2016; Taylor et al., 2008).

In addition to need satisfaction and frustration, teachers' beliefs about intelligence and abilities is another crucial factor in shaping teaching practices (Hanin et al., 2022). Teachers' conception of students' intelligence is a moderating factor guiding their educational goals and practices within the classroom (Lynott & Woolfolk, 1994). These

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beliefs also shape the adoption of autonomous or controlling teaching practices (Reeve et al., 2014), their responsibility in teaching, and foster their job satisfaction, motivation, and enthusiasm at work (Tao et al., 2021). More specifically, following Dweck's model (C. S. Dweck, 1999), teachers might have an incremental or entity conception of intelligence and general abilities. The incremental perception characterises intelligence as malleable, controllable and increasable through effort, while the entity perception defines intelligence and abilities as fixed and uncontrollable. While first one favours the adoption of *learning goals* aimed at increasing personal skills and abilities, the second one encourages *performance goals* aimed at the prompt demonstration of the adequacy of one's abilities (C. S. Dweck, 1999; C. S. Dweck & Leggett, 1988; Elliott & Dweck, 1988; Grant & Dweck, 2003).

In the school context, an incremental conception of students' intelligence is more likely associated with more effective teaching practices, promoting a socio-constructivist approach to teaching and learning, active learning, and engagement in the learning process (Catalano et al., 2022). For example, teachers could build a cooperative environment among students, provide helpful feedback, promote a constructive attitude towards failures and obstacles, emphasize learning goals, highlight effort and investment, use error as a drive for learning, and ultimately, stimulate autonomy in the learning process, critical thinking, and creativity. Additionally, some studies (Brooks & Brooks, 1999; Catalano et al., 2022; Organisation for Economic and Co-Operation and Development, 2009) observed that teachers with an entity perspective are less attentive to educational relationships, showing lower interest and attention to students' emotional experience. Consequently, teachers' implicit assumptions are communicated to students verbally and non-verbally, influencing their motivation and engagement (Aragón et al., 2018; Hanin et al., 2022). For instance, entity-oriented messages could drive students to perceive their intelligence negatively if their hard work results in unsuccessful performance. (Yeager et al., 2022).

Another key feature of teachers' beliefs is teaching self-efficacy, which refers to teachers' belief concerning their ability to teach students, facilitate their learning, and manage student behaviour in school (Guskey & Passaro, 1994). Teachers' self-efficacy strongly predicts teachers' engagement at work (e.g., Liu et al., 2024) and behaviour (Catalano et al., 2022), where higher levels of self-efficacy are connected to the adoption of innovative teaching methods (Klassen & Tze, 2014) and student-oriented practices (Catalano et al., 2022; Organisation for Economic and Co-Operation and Development, 2009). Conversely, teachers with lower levels of self-efficacy tend to adopt controlling strategies, such as punishment (Martin & Sass, 2010), and traditional strategies and methods for teaching and classroom management (Catalano et al., 2022). According to the social cognitive theory (Bandura, 1986, 2001), teachers who perceive themselves as competent, believing in their efficacy, are more motivated to create a more adaptive learning environment for students and better cope with various challenges (Bandura, 1993). Additionally, teachers with strong self-efficacy showed more attention to the educational relationship with students and are better at regulating their emotions (Catalano et al., 2022), facilitating them to build a closer relationship with their students (Anthony & Krittsonis, 2007).

## 1.2. Hypothetical model of the study

Few studies have examined if individual factors and teachers' perceptions and beliefs may influence teachers' perception toward their teaching practices. Furthermore, to the best of our knowledge, this study is the first attempt to create a self-report questionnaire to evaluate teachers' tendency toward a student-oriented or a teacher-centered teaching practices based on factors described by Stipek and Byler (2004). Additionally, limited studies have been done on how individual factors, such as teachers' self-perceived self-efficacy, satisfaction and frustration with their needs, and conceptions about students' intelligence, interact to shape different teacher practices.

Therefore, this study aims to fill the existing literature gap by examining how teachers' factors and beliefs influence their tendency toward the two teaching practices. It also validates a self-report questionnaire evaluating teachers' tendency toward teacher-centered and student-oriented teaching practices. Furthermore, the study analyses constructive and didactic teaching profiles, focusing on teachers' motivation, teaching practices, and personal characteristics. Two studies were conducted to test the hypotheses formulated based on our literature review.

**H1.** Teachers with higher teaching self-efficacy and an incremental belief about students' intelligence would predominantly tend toward a student-oriented teaching practice.

**H2.** Teachers with high level of need satisfaction and low level of need frustration would predominantly tend toward a student-oriented teaching practice.

**H3.** The *Student-oriented vs Teacher-centered Teaching Practice Scale* would have a two-factor structure and good psychometric properties.

**H4.** Two distinct profiles will be identified: the constructive teacher's profile and the didactic teacher's profile. A strong sense of teacher self-efficacy, an incremental belief in student intelligence, a student-oriented teaching practices, high levels of need satisfaction and low level of need frustration would characterise the constructive teacher's profile. In contrast, the didactic teacher's profile would be marked by a weak sense of teacher self-efficacy, an entity belief in student intelligence, a teacher-centered teaching practices, low level of need satisfaction and high level of need frustration.

## 2. Study 1

### 2.1. Methods

#### 2.1.1. Participants

The sample consisted of 447 Italian teachers (85 % female), with a mean age of 38.7 years (SD = 4.49). Participants were recruited at different schools in Palermo. The study was approved by the Bioethical Committee of the University of Palermo with protocol n° 2758/2024 and conducted respecting the Declaration of Helsinki principles.

#### 2.1.2. Measures

**2.1.2.1. The Basic Psychological Need Satisfaction and Frustration Scale [BPNSFS].** Teachers' levels of need frustration and satisfaction were evaluated using the Italian version of the *Basic Psychological Need Satisfaction and Frustration Scale - BPNSFS*. This scale consists of 24 items that measure both the satisfaction and frustration of three psychological needs in general: autonomy satisfaction (4 items), competence satisfaction (4 items), relatedness satisfaction (4 items), autonomy frustration (4 items), competence frustration (4 items), and relatedness frustration (4 items). Respondents rate each item on a 5-point Likert scale, where 1 indicates "completely disagree" and 5 indicates "completely agree". Two scores were calculated by separately averaging the need satisfaction and frustration items, as reported by Katz and Moè (2024). Both "Need Satisfaction" and "Need Frustration" subscales' Cronbach's  $\alpha$  values were equal to 0.85, showing a robust internal reliability.

**2.1.2.2. Student-oriented vs teacher-centered Teaching Practice Scale [STTPS].** Teaching practices were assessed through the teacher/student-oriented practice questionnaire, a self-reported questionnaire created by the Authors. According to Lerkkanen et al. (2016), teacher-centered practices emphasize the role of teachers in providing information through the employment of structured group lessons, praising children when a pre-determined goal is reached. Examples for

teacher-centered practices could be lessons delivered through traditional methods and lack of flexibility in the classroom management (including lesson contents). Conversely, student-oriented practices emphasize the role of students in building their own knowledge, with teachers seen as facilitator of this process. For instance, using interactive teaching methods (e.g., debate, peer-review) or group projects can be considered examples of student-oriented teaching practices.

The questionnaire was created by selecting some items from the observational checklist of [Stipek and Byler \(2004\)](#). The scale consists of 8 bipolar items on 7 points, of which one indicates the student-oriented practice (i.e., “My rules and my teaching classroom teaching routine are flexible”). In contrast, the other side identifies the teacher-centered practice (“My rules and my classroom teaching routine are not easily modifiable”). The structure of the questionnaire included two factors, which are personalised vs. fixed teaching practices (4 items) and teacher-vs. student-oriented beliefs (4 items). The total score ranges from  $-24$  (fully teacher-centered) to  $+24$  (fully student-oriented). Cronbach alpha for the general scale is acceptable ( $\alpha = 0.73$ ).

**2.1.2.3. Teacher Sense of Efficacy Scale [TSES].** Teachers’ self-efficacy was evaluated using the short version of the *Teacher Sense of Efficacy Scale* - TSES ([Tschannen-Moran & Hoy, 2001](#)), reported by [Jamil et al. \(2012\)](#). This scale consists of 12 items that measure efficacy for instructional strategies, efficacy for classroom management, and efficacy for student engagement. Respondents rate each item on a 9-point Likert scale, where 1 indicates “nothing” and 9 indicates “a great deal”, indicating how much they can do to manage the classroom in specific situations (e.g., “How much can you do to control disruptive behaviour in the classroom”; “How much can you do to motivate students who show low interest in schoolwork”). The scale had excellent internal consistency (Cronbach’s  $\alpha = 0.96$ ).

**2.1.2.4. The Scale of Teacher Conception of Intelligence [STCI].** Teachers’ conception of students’ intelligence was assessed using the *Scale of Teacher Conception of Intelligence* - STCI developed by [Alesi and Pepi \(2005\)](#). This scale consists of 18 items that measure three dimensions: the incremental or entity nature of intelligence, the perception of controllability or uncontrollability of efforts and educational strategies that aim for praise or punishment based on skill or effort. The scale had adequate internal consistency (Cronbach’s  $\alpha = 0.71$ ).

### 2.1.3. Data analysis

Data analysis was performed through the R software (version 4.0.5). Concerning the perception of teaching practices questionnaire, Exploratory and Confirmatory Factor Analysis (EFA and CFA) were performed through the package *lavaan*. Specifically, EFA was conducted to explore the factorial structure of the questionnaire and was performed with oblimin rotation and minimum residual (minres) solution. CFA was performed on the pool of items using the maximum likelihood model estimation method with robust standard errors (MLR). We hypothesized two dimensions of teaching practices: personalised vs. fixed teaching practice (4 items) and teacher-vs. student-oriented beliefs (4 items). The fit of the model was evaluated with the robust  $\chi^2$  statistic, the root means square error of approximation (RMSEA), the robust Tucker-Lewis Index (TLI) and the robust comparative fit index (CFI).

Concerning the relationship among teachers’ self-efficacy, their concept of student intelligence, and their teaching practices with need satisfaction and frustration, a mediation model was tested using the *Jamovi* package *jamm* (version 2.6.17). In this model, teachers’ self-efficacy was considered as a mediator between teachers’ conception of intelligence and need satisfaction and frustration, while teaching practices was considered as the outcome variable.

## 3. Results

### 3.1. Analysis of psychometric properties of the student-oriented vs teacher-centered teaching practices scale

The exploratory factor analysis (EFA) was performed with oblimin rotation and minimum residual (minres) solution. The EFA yielded a two-factor solution, explaining the 42.30 % of variance ([Table 1](#)). Confirmatory factor analysis (CFA) was then performed to detect the fit of the two-factor solution, whose results should have the CFI and TLI higher than 0.95 and an RMSEA lower than 0.08. Our CFA reported an excellent fit (Chi-squared test = 35.5,  $p = 0.012$ , CFI = 0.97, TLI = 0.98, RMSEA = 0.04, 90 % CI 0.02; 0.06). [Table 2](#) report descriptive statistics for each item, and items factor loading.

### 3.2. Relationship among teachers’ self-efficacy, their concept of student intelligence, and their teaching practices with need satisfaction and frustration

Bivariate correlations were calculated among all variables using Pearson’s method. All the factors were correlated each others, as can be seen from [Table 4](#). The descriptive statistics are reported in [Table 3](#).

The results of the mediation model showed a significant direct effect of teachers’ intelligence concept on both self-efficacy ( $b = 0.28$  [95% CI  $-0.16, 0.40$ ],  $\beta = 0.20$ ,  $z = 4.62$ ,  $p < .001$ ) and teaching practices ( $b = 0.30$  [95% CI  $-0.23, 0.36$ ],  $\beta = 0.39$ ,  $z = 8.73$ ,  $p < .001$ ), with the latter partially mediated by self-efficacy ( $b = 0.02$  [95% CI  $-0.003, 0.037$ ],  $\beta = 0.03$ ,  $z = 2.57$ ,  $p < 0.05$ ). Need satisfaction and frustration also showed significant direct effects on teachers’ self-efficacy (satisfaction  $- b = 8.08$  [95% CI  $-5.25, 10.91$ ],  $\beta = 0.28$ ,  $z = 5.60$ ,  $p < .001$ ; frustration  $- b = -2.99$  [95% CI  $-5.08, -0.91$ ],  $\beta = -0.14$ ,  $z = -2.81$ ,  $p < .01$ ). Additionally, teachers’ self-efficacy showed a direct significant effect on teaching practices ( $b = 0.07$  [95% CI  $-0.03, 0.12$ ],  $\beta = 0.14$ ,  $z = 3.10$ ,  $p < .01$ ). The analysis also showed a significant partial mediation role of teachers’ self-efficacy in the relationship between need satisfaction and teaching practices ( $b = 0.59$  [95% CI  $-0.09, 0.99$ ],  $\beta = 0.04$ ,  $z = 2.37$ ,  $p < .05$ ), and need frustration and teaching practices ( $b = -0.22$  [95% CI  $-0.43, -0.01$ ],  $\beta = -0.02$ ,  $z = -2.08$ ,  $p < .05$ ). Finally, the total effect of Teachers’ intelligence concept on teaching practices was also significant ( $b = 0.33$  [95% CI  $-0.26, 0.39$ ],  $\beta = 0.43$ ,  $z = 9.99$ ,  $p < .001$ ). The key findings are illustrated in [Fig. 1](#), providing a clear graphical overview.

## 4. Study 2

### 4.1. Method

#### 4.1.1. Participants

The sample used in this study is the same as the one used in Study 1. We analysed the data separately to explore possible teacher profiles.

**Table 1**  
– Variance explained by the two-factors model.

	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Eigenvalues	Percentage of variance	Cumulative percentage of variance	Total	Percentage of variance
1	3.177	39.718	39.718	2.595	32.439
2	1.124	14.046	53.764	0.888	11.101
3	0.986	12.323	66.087		
4	0.813	10.165	76.252		
5	0.743	9.291	85.542		
6	0.574	7.174	92.716		
7	0.499	6.243	98.959		
8	0.083	1.041	100.00		

**Table 2**

– Descriptive statistic and factor loadings for the scale items. The factor comprising items 1,2,3,4 related the personalization vs fixed teaching factor, while the items 5,6,7,8 were part of the teacher-vs. student-oriented beliefs factor.

	Mean	SD	Asymmetry	Kurtosis	Personalization (Factor 1)	Beliefs (Factor 2)
Item 1 – I allow students to take the responsibilities that they can manage	2.11	1.20	1.55	2.65	0.92	
Item 2 – My classroom rules and routine are flexible	2.33	1.34	1.33	1.50	0.85	
Item 3 – I take the majority of the decisions myself	3.32	1.73	0.38	1.00	0.52	
Item 4 – I involve the whole class to find new solutions	2.91	1.84	0.79	-0.58	0.66	
Item 5 – I believe that all the students can reach the same learning levels that I have set	5.52	1.61	-1.15	0.44		0.51
Item 6 – I let students using innovative tools for learning (e.g., technology, multimedia materials)	2.35	1.23	1.17	1.42		0.59
Item 7 – I believe that each student has a personal learning style	1.52	1.12	2.72	8.17		1.09
Item 8 – I take into account the students' preferred cognitive and learning styles	1.55	1.06	2.62	8.44		0.97

**Table 3**

– Descriptive analysis for teaching practice, self-efficacy, teachers' beliefs, need satisfaction and frustration.

	Mean	Median	SD	Min	Max	Percentiles		
						25th	50th	75th
Teaching practice	45.44	46.00	6.655	16.00	56.00	42.00	46.00	50.00
Teacher self efficacy	84.85	87.00	12.402	12.00	108.00	79.00	87.00	93.00
Teacher beliefs	79.58	80.00	8.666	54.00	100.00	75.00	80.00	85.00
Need Satisfaction	4.32	4.42	0.437	2.58	5.00	4.08	4.42	4.67
Need Frustration	1.80	1.67	0.589	1.00	5.00	1.33	1.67	2.17

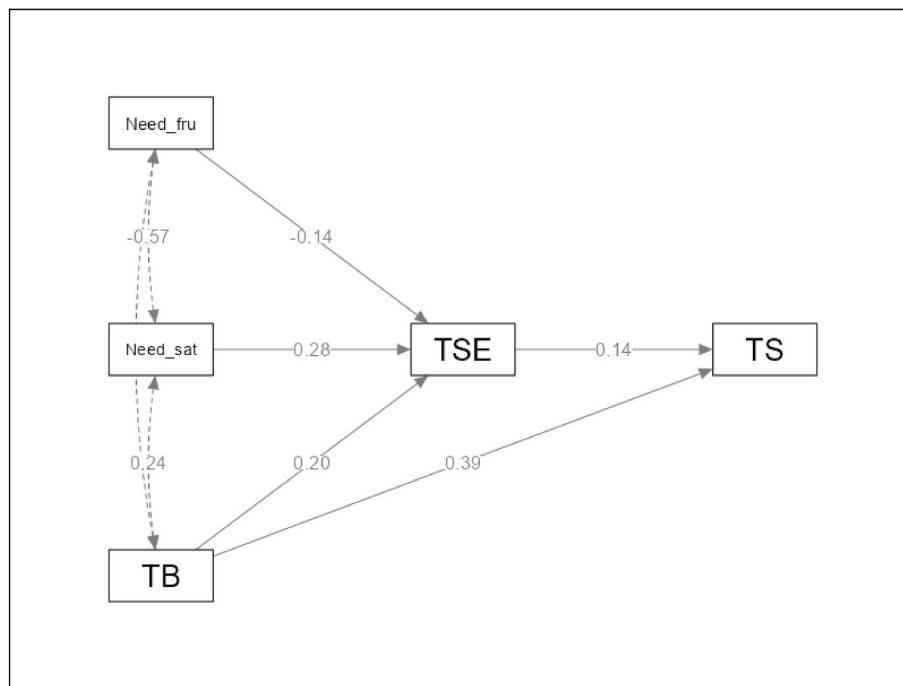
**Table 4**

– Correlations among the variables included within the study.

	1	2	3	4
Teaching Practice (1)	–			
Teacher Beliefs (2)	0.251***	–		
Need Satisfaction (3)	0.426***	0.297***	–	
Need Frustration (4)	0.163***	0.413***	0.242***	–

**4.1.2. Data analysis**

A two-step cluster analysis was performed through SPSS (version 25.0.0) to analyse teachers' profiles based on teaching practices, teachers' conception of their student's intelligence, teachers' self-perceived self-efficacy in teaching and motivational profiles according to Self-Determination Theory (Deci & Ryan, 2000). The clusters were analysed, creating two levels for each variable. The first and second quartiles of scores at measures of teachers' self-efficacy, need satisfaction, and frustration were categorised as "low-level," while the third and fourth quartiles were categorised as "high-level". The first and second quartiles of scores at measures of teaching practices were categorised as "teacher-centered", while the third and fourth quartiles were



**Fig. 1.** Path analysis model of the relationship between beliefs, self-efficacy, teaching styles and motivation

**Note:** Need\_fru – Need Frustration; Need\_sat – Need satisfaction; TB – Teachers' Beliefs; TSE – Teachers' Self-Efficacy; TS – Teaching Style.

categorised as “student-oriented”. Finally, the first and second quartiles of scores at measures of teachers’ conception of students’ intelligence were categorised as “entity perception”. In contrast, the third and fourth quartiles were categorised as “incremental perception”.

## 4.2. Results

### 4.2.1. Analysis of teachers’ profile

A two-way cluster analysis was performed to gain insights into teachers’ profiles. The two clusters’ compositions are presented in Fig. 2.

The analyses brought two clusters of comparable dimensions: the smallest one includes 47.9 % of the total sample (139 individuals), and the greatest one includes 52.1 % (151 individuals). The analysis showed a 0.6 silhouette media value, meaning that the quality of the clusters is good. The ratio of the sizes between the most significant and most minor clusters was calculated, and a value of 1.09 was found, which is good. Self-efficacy and need satisfaction are the best predictors, with variable importance values equal to 1, followed by need frustration (0.54) and teachers’ conception of students’ intelligence (0.49). Teaching practice was the less important factor in the two clusters, showing a variable importance value equal to 0.27.

## 5. General discussion

The primary goal of this study was to investigate how teachers’ conceptions of students’ intelligence, self-efficacy, and experiences of need satisfaction and frustration influence the perception of teaching practices adopted in the classroom. The second aim was to analyse teachers’ profiles, focusing on their motivation, teaching practices, conceptions about students’ intelligence, and other teacher-related factors.

Pearson’s bivariate correlations in the overall sample indicated that teaching practices positively correlate with self-efficacy and teachers’ conception of students’ intelligence. These findings align with previous research (Anthony & Kritsonis, 2007; Catalano et al., 2022; A. Hoy, 2004; Klassen & Tze, 2014), suggesting that teachers with an incremental mindset on students’ intelligence and higher teaching self-efficacy also tend to use more active strategies, such as involving their students actively during lessons and encouraging students to take responsibility for constructing their knowledge, resulting in a more student-oriented practice. As hypothesized by the Authors and in previous studies (Keller et al., 2024; Wang et al., 2016), teachers’ needs satisfaction positively correlates with their self-efficacy, conceptions of intelligence, and tendency toward one of the two teaching practices. Conversely, the frustration of these needs is negatively correlated with these variables. Specifically, when teachers can act autonomously, experiencing meaningful relationships, and believing to be competent in their roles, they tend to have a favourable view of their teaching effectiveness. They might also believe that their students’ intelligence can be

developed and are more likely to employ active teaching strategies. In contrast, when teachers feel compelled to act in specific ways, with few or superficial relationships, and lack confidence in their abilities, they may perceive their teaching effectiveness negatively. They also could believe that students’ intelligence cannot be enhanced, resulting in more directive teaching strategies, such as acting as knowledge transmitters and making students memorise facts and information (Assen, 2018).

Finally, the study examined the mediating role of teachers’ self-efficacy between their conception of intelligence and need satisfaction and frustration with a tendency toward one of the two teaching practices. According to the results, teachers’ intelligence conception significantly predicts their tendency toward one of the two teaching practices, with this relationship being partially mediated by self-efficacy. However, the effect size for the mediation relation was low, although significant. These results also suggest that holding an incremental conception of students’ intelligence may boost teachers’ sense of self-efficacy, leading to adopt a student-oriented approach. Teachers’ self-efficacy also seems to mediate the relationship between the perception of teaching practices and need satisfaction, showing a higher effect than teachers’ intelligence conception. In this way, if teachers hold incremental or entity conceptions that influence their teaching practices more than their satisfaction with autonomy, relatedness, and competence. Notably, the satisfaction of basic psychological needs has a positive indirect effect on teaching practices through self-efficacy (Moè et al., 2022; Stebbings et al., 2011). However, no significant direct effects of satisfaction and frustration on teaching practices were found, clarifying that this relationship is only mediated by self-efficacy in teachers.

In the second study, a two-way cluster analysis was conducted to analyse teachers’ profiles, which identified two homogeneous subgroups corresponding to constructive and didactic teaching profiles. Teachers within the former profile presented high levels of need satisfaction and low levels of need frustration, with an incremental conception of students’ intelligence and high levels of self-efficacy, showing a tendency toward a student-oriented teaching practice. In contrast, teachers of the didactic cluster presented low levels of need satisfaction and high levels of need frustration, with an innate conception of students’ intelligence and low levels of self-efficacy, showing a tendency toward a teacher-centered teaching practice. The significant differences observed between the two clusters concerning need frustration and satisfaction align with the Self-Determination Theory (Deci & Ryan, 2000), according to which teachers with high levels of need satisfaction and low frustration tend to act supportively towards their students and foster their autonomy. This finding is consistent with results from other studies (Busque-Carrier et al., 2022; Deci & Ryan, 2014; Moè et al., 2022), indicating that such conditions lead to more motivating behaviours (Matosic et al., 2016; Vansteenkiste et al., 2020).

The analysis of the importance values of predictors shows that the perception of teacher-centered or student-oriented teaching practices is

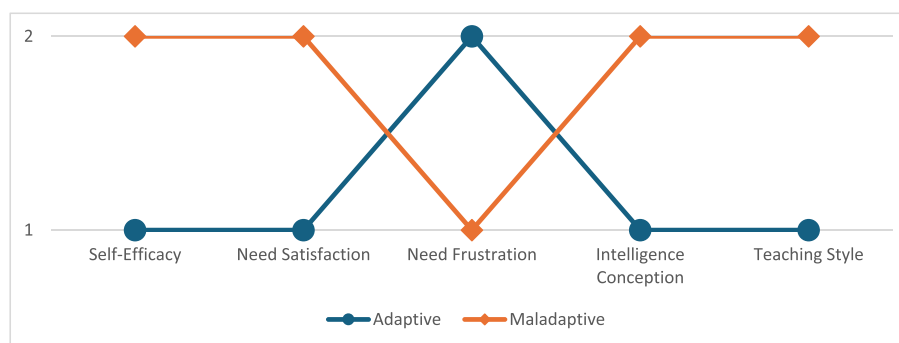


Fig. 2. Cluster composition

Note: 1 – indicates a value lower than the second quartile; 2 – indicates a value higher than the second quartile.

not a predictor as strong as self-efficacy and teachers' intelligence conception. In our sample, the perception of teaching practice defines teachers within the didactic profile better than teachers within the constructive one. The percentage of teachers who show the same teaching practice is higher in the didactic profile than in the constructive one. This suggests that teachers who are less confident in their abilities and whose needs are not satisfied are more likely to adopt a more directive, teacher-centered teaching practices. Additionally, within the didactic profile, teachers not feeling competent also tend to believe that students possess a certain level of intelligence that cannot be enhanced, showing an incremental conception of their students' intelligence. This suggests that having an entity conception of intelligence, low self-efficacy in teaching, and a combination of low frustration and high satisfaction with basic psychological needs may have a more significant influence on teachers' perception of the teaching practices, leading teachers to adopt a more directive teacher-centered approach with their students.

### 5.1. Implications for practice

Starting from the results outlining two teachers' profiles, our data provide the basis for implications for pedagogical and psychological practitioners on managing classrooms. Our findings extend research demonstrating how a constructive teaching profile is characterized by high levels of need satisfaction and low levels of need frustration, an incremental conception of students' intelligence, high levels of self-efficacy and the perception of a student-oriented teaching approach whilst a didactic profile was characterized by low levels of need satisfaction and high levels of need frustration, an innate conception of students' intelligence, low levels of self-efficacy and a perception of teacher-oriented teaching approach. These characteristics are critically important regarding providing learning opportunities, shaping the classroom climate, and managing the classroom. For example, a student-oriented approach has to use facilitators able to stimulate learning potential, enhance active learning experiences, collaborative and deeper learning strategies, self-regulated and metacognitive learning.

For this purpose, for example, it has proven helpful to use Web 2.0 tools and technology-enhanced learning practices in class. The Web 2.0 tools, such as blogs, wikis, Movie Maker, podcasts, and social networking sites, can allow students to actively collaborate and communicate with others, to develop skills such as problem solving and critical thinking, and media literacy to create and share digital and Web-based artefacts. So, students feel more responsible for their learning, are free to express their opinions, and build their learning process by combining individual work and peer feedback, alternating individual and collaborative learning phases. They can experiment with autonomy in controlling and directing their behaviour to achieve learning goals with the teacher assuming the role of facilitator (Muianga et al., 2018).

Nevertheless, other traditional methods, such as problem-based learning (PBL), are learner-oriented approaches that can increase active, deep, self-directed, constructive, and collaborative learning processes (Assen, 2018). Learner-oriented approaches are based on modelling, coaching, scaffolding, reflection, and exploration strategies to provide a supportive, nondirective teaching style. So, learner-oriented intervention programs fall into two main categories: content activator aimed at reinforcing supportive behaviour in guiding content, and process observer aimed at reinforcing supportive behaviour in guiding process. Whilst teacher-oriented interventions are content instructors that support directive behaviour in guiding content, and process organisers that support directive behaviour in guiding process.

Moreover, our examples of teachers profiles suggest that intervention programs would act at the same time on teachers' variables, by satisfying their basic psychological needs and increasing their self-efficacy and job satisfaction, through opportunities for collaboration among adults (Chester & Beaudin, 1996; Rosenholtz, 1989), coaching activities (Ross, 1992), higher-quality tutor systems (Liu et al., 2020),

support at school (Gershy & Katz, 2023), occasions to participate in decision-making activities (Newmann et al., 1989), improvement of school and staffroom climate (Grayson & Alvarez, 2008; Hoy & Woolfolk, 1990; Moore & Esselman, 1992). Also, for teachers, the use of Web 2.0 tools would support them individually by collaborative experiences, for example, providing a platform for teachers to share their emotions, concerns, and difficulties as well as to share and exchange good practices to promote autonomous and self-regulated learning in the classroom (Katz & Shahar, 2015).

Finally, considering that teachers' perceptions of their teaching practices do not completely match with the real performance (Montgomery & Baker, 2007), introducing a self-evaluation tool could be useful to be aware about the teaching process.

### 5.2. Conclusion

The present paper investigated how teachers' conceptions of students' intelligence, self-efficacy, and experiences of need satisfaction and frustration influence the perception of the teaching practices. The second aim was to analyse teachers' profiles, focusing on their motivation, teaching practices, conceptions of students' intelligence, and other teacher-related factors. The first study reported a significant influence of teachers' self-efficacy and conception of students' intelligence on their tendency toward one of the two teaching practices (i.e., student-oriented and teacher-centered). Moreover, the satisfaction of basic psychological needs positively and indirectly affects teaching practices through self-efficacy.

The second study identified two teachers' profiles, which we named constructive and didactic. The constructive profile was characterised by high levels of need satisfaction and low levels of need frustration, an incremental conception of students' intelligence, high levels of self-efficacy and the perception of a student-oriented teaching practice. In contrast, the didactic profile was characterised by low levels of need satisfaction and high levels of need frustration, an innate conception of students' intelligence, low levels of self-efficacy and a perception of teacher-centered teaching practice. It is particularly noteworthy that, in our sample, the inclination towards one of the two teaching practices appears to be a more robust predictor of the didactic profile. This suggests that holding an entity conception of intelligence, low self-efficacy in teaching, and a blend of low frustration with high satisfaction regarding basic psychological needs may exert a more pronounced influence on teachers' propensity for a specific teaching practice.

#### 5.2.1. Limitations and future directions

These findings further increase our understanding of how teachers' intelligence conception influences their self-efficacy and teaching practices, confirming the importance of studying teachers' belief systems (Buehl & Beck, 2015). However, the present studies present some limitations. Firstly, the gender-unbalanced sample does not consent to explore possible differences in teaching practices between female and male teachers. Additionally, the sample's provenience was uniquely from Southern Italy, representing a possible bias source. Future research should consider a more balanced sample to explore differences in the tendency toward the two practices based on gender. Additionally, future research should include information about teachers' grades to better define teachers' profiles based on differences in school settings and student development. It would also help to identify possible moderators in teachers' self-efficacy and need satisfaction.

Moreover, the present research does not consider teachers' motivation and the effective methods that they adopt in class despite their perception of teaching practices. As noted in the introduction, teachers' motivation significantly influences their teaching methods and behaviour, both negatively (Vermote et al., 2020) and positively (Matosic et al., 2016; Taylor et al., 2008). Including teachers' motivation might help to define teachers' profiles better. Another consideration is to include a direct observation of the teaching methods and strategies, such

as instructive lessons, inquiry-based learning and problem-based learning. Over the years, a debate arose on what teaching methods (i. e., instructive or socio-constructive) are more efficient than the others, considering the two at odds. However, recently, it was found that different approaches are often combined, making it difficult to find a clear dividing line between student-oriented and teacher-centered practices (de Jong et al., 2023). Observing the teaching methods and strategies adopted in class (e.g., instructive lessons, inquiry-based learning, cooperative learning, etc.) might help to understand how a preference for one of the two teaching practices might affect teachers' choices concerning teaching methods.

Finally, the current research refers to the work of Stipek and Byler (2004), which focuses on teachers in early school years, while we generalized their work to teachers from primary and secondary school. Future research should compare the different practices and configurations of motivation and self-efficacy differentiating the school contexts (kindergarten, primary and secondary school level).

### CRedit authorship contribution statement

**Gabriele Gullo:** Writing – original draft, Formal analysis. **Ambra Gentile:** Writing – review & editing, Validation, Investigation. **Barbara Caci:** Supervision, Methodology, Conceptualization. **Marianna Alesi:** Supervision, Project administration, Methodology, Conceptualization.

### Ethical considerations

The study has been approved by the University Committee of Palermo with protocol n° 2758-2024 and was conducted respecting the Declaration of Helsinki principles.

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### Declaration of competing interest

The Authors declare no conflict of interests.

### Data availability statement

Data sharing is not allowed due to legal restrictions and are available under formal request addressed to the Bioethical Committee at the University of Palermo.

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