



# A new measure for the assessment of the university engagement: The SInAPSi academic engagement scale (SAES)

Maria Francesca Freda<sup>1</sup> · De Luca Picione Raffaele<sup>2</sup> · Giovanna Esposito<sup>1</sup> · Giancarlo Ragozini<sup>3</sup> · Italo Testa<sup>4</sup>

Accepted: 3 August 2021 / Published online: 6 September 2021

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## Abstract

Despite the growing interest on the notion of academic engagement (AE) and its relevance for students' success, a few valid and reliable instruments on AE have been developed. Moreover, most of the available measures consider AE as a student's trait rather than a relational and situated dynamic process. This study presents the development and validation of a new instrument, the SInAPSi Academic Engagement Scale (SAES), which was developed within a project coordinated by the SInAPSi center of the Authors' University and it aims to measure AE. The main sample was constituted by 680 students and a convenience sample of 312 biology and biotechnologies students was also involved to perform the confirmatory factor analysis of the initial factor structure of the SAES. Construct validity was assessed using the University Student Engagement Inventory (USEI), while criterion-related validity was established with the Academic Motivation Scale (AMS), the students' confidence in one's own preparation for academic studies and their academic performance. Results show that the SAES presents a robust factor structure, a good convergent and discriminant validity, and satisfactory psychometric properties. Furthermore, the SAES shows a positive correlation with the USEI and the AMS, the students' confidence in their preparation for academic studies and their academic performance. The results indicate that the SAES can produce valid and reliable data on AE and it may have strong implications for assessing AE and implementing intervention programs for university students.

**Keywords** Student engagement · Validation · Student motivation · Student success, student drop out

In recent decades, we have witnessed a growing focus on the notion of engagement in various areas of psychology, social sciences and education. The interest toward this notion is strictly connected to an increasing acknowledgment that personal participation in social and institutional contexts is a crucial factor for all social processes of innovation and development. Indeed, this perspective has its own origin in marketing and consumer psychology (Brodie et al., 2011; Hollebeek, 2011). Then, we find many important and fruitful developments of engagement notion in the job and organizational context, in the health sector, and in school and academic contexts.

For example, in the context of job and human resources, the notion of “work engagement” generally refers

to the propensity of the worker to be fully present in the organization, the willingness of individuals to act in a way that follows the interests of the structure for which they work feeling attracted, dedicated and enthusiastic (Schaufeli & Salanova, 2014). In the field of health psychology, the notion of engagement finds interesting developments in the study of the physician, patient and health system relationship. The focus is on the deeply relational nature among the participants involved (Graffigna et al., 2015; Lee & Lin, 2010).

For this study, it is particularly relevant the notion of engagement in the education context. For such reason, we review in the following section prior literature about the engagement construct in this specific context.

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✉ Giovanna Esposito  
giovan.esposito@unina.it

<sup>1</sup> Department of Humanities, University of Naples Federico II, Via Porta di Massa, 1, 80133 Naples, Italy

<sup>2</sup> Faculty of Law, University of Studies ‘Giustino Fortunato’, Via Delcogliano 12, BN 82100 Benevento, Italy

<sup>3</sup> Department of Physics “E. Pancini”, University of Naples Federico II, Complesso M.S Angelo, Via Cintia, 80126 Naples, Italy

<sup>4</sup> Department of Political Sciences, University of Naples Federico II, Via Leopoldo Rodinò, 22a, 80133 Naples, Italy

## Engagement in Education Contexts

In the educational and school psychology context, engagement has received increasingly great attention, soon becoming one of the central constructs for the study of learning and participation processes, dropout prevention, the ability to reach successfully the conclusion of one's studies.

Engagement in education, school and academia context has generated a wide set of models and research. Yet, each conceptualization centralizes specific dimensions of participation, behavior, action, emotion, investment, motivation, and so on (Appleton et al., 2008).

A core idea widely shared is that engaged students are not just students who simply attend and participate in lessons, but they are able to sustain efforts, commitment, self-regulate behaviors and choices, negotiate and share their goals with others (colleagues, peers, teachers, families, etc.), accept the challenge of their limits in learning processes. Students' engagement is generally associated with a positive view of their own study activity, not illusorily optimistic, but capable of showing and developing resources in terms of industriousness, activity and initiative.

Despite these shared aspects, consensus about what engagement is has not yet been reached (Christenson et al., 2012). For instance, engagement is considered by some scholars as a result (i.e., as the outcome achieved and as a stable condition) (; Girelli, Alivernini, Lucidi, et al., 2018b), while others consider it as a process that takes place dynamically during multiple interactions and is therefore presented as a development of intra-inter-subjective and contextual interactions (Appleton et al., 2008; De Luca Picione and Valsiner 2017; Skinner et al., 2008).

Starting from these two different conceptions, many empirical studies and research studies aimed at detecting the different factors involved in the construct of engagement. We can identify two different research paradigms that have focused on specific components and variables. The two major approaches present in the literature are on the one hand that of Fredricks et al. (2004), which values the engagement of students in cognitive, behavioral and emotional terms, and, on the other hand, that of Schaufeli et al. (2002a, 2002b), which adopts the variables of vigor, dedication, and absorption from the work context into the educational context (Alrashidi et al., 2016). The first approach conceptualizes engagement as a multidimensional construct of which are part (Fredricks et al., 2004):

- a) Directly observable *behavioral aspects* (e.g., positive conduct, attendance, adhering to the norms of the classroom, following the rules, participation in learning and academic-related tasks, etc.)
- b) *Cognitive processes* carried out during the study (e.g., understanding, appropriate learning strategies, elaboration rather than memorization, flexibility in problem solving, etc.).

- c) *Emotional processes* (e.g., positive versus negative emotional attitude, interest and motivation, processes of emotional regulation, sense of 'identification with' and "belonging to the school/academy").

In the second perspective, Schaufeli et al. (2002a, 2002b) student engagement conceptualization focuses on students' feelings of vigor, their dedication to their studies, and their absorption in academic-related tasks and activities (Schaufeli et al., 2002a, 2002b). Here, emphasis is on individual dimension of energy, willingness, effort, persistence, enthusiasm, concentration.

However, it is important to recognize that other variables are becoming increasingly central in the educational engagement research field. First, we note that engaged attitudes, in their different nuances, can work not only by drawing a positive profile of achievement of goals, but also by preventing certain inappropriate conditions, such as disaffection, boredom, drop-out or scarcity of results, excessive extension of normal study time (Jang et al., 2016). Many studies have demonstrated the association between engagement, successful achievements (Phan, 2014) and students' willingness to exert effort towards learning (Alrashidi et al., 2016). In particular, it was proven that engagement helps students to deal with the university difficulties, enhances their motivation and involvement in university-related activities, prevents the intention to drop-out, supports the academic achievements and the learning process (Abbott-Chapman et al., 2014; Gilardi & Guglielmetti, 2011; Girelli, Alivernini, Salvatore, et al., 2018a; Girelli, Alivernini, Lucidi, et al., 2018b; Klem & Connell, 2004). In other words, by becoming more aware of the difficulties they are encountering during their academic trajectory, engaged students may increase their ability to sustain the efforts to deal with these difficulties and to affect their own performance (Ajzen, 1991; Perry, 2003; Perry et al., 2005) as well as to persist in their choice of attending university (Girelli et al., 2018a, b; Hardrè & Reeve, 2003).

Second, many authors increasingly acknowledge that, as in any human experience, the role of social relations, contextual frames and shareable experiences by means of which students interact and confront each other cannot be ignored in a dynamic conceptualization of engagement (Alivernini et al., 2019; De Luca Picione et al., 2020; Braxton et al., 2000; Cavicchiolo, Girelli, Lucidi, et al., 2019a; Kahu, 2013; Shernoff et al., 2016).

In particular, social dimensions allow us to acknowledge processual and relational aspects of engagement, as an activity that develops itself over time through transitions, experiences and sharing with others (wherein the most significant figures are teachers, fellow students, but also families and friends) (Cavicchiolo, Girelli, Di Leo, et al., 2019b; Girelli et al., 2019). The social dimension is acknowledged in the engagement model developed by Finn and Zimmer (2012), who

added to the tripartite conceptualization of Fredricks and colleagues also the social relationships established at the university with both other students and faculty members. The social relationships with peers may have a significant impact on students' motivation and adjustment to the educational contexts (Cavichio, Girelli, Lucidi, et al., 2019a). Similarly, the relationship with faculty members not only has a great relevance on students' self-regulation (Williams & Deci, 1996) but also may nurture and contribute to develop students' inner motivational resources to prevent drop-out (Girelli et al., 2018a, b; Hardrè & Reeve, 2003). Within this perspective, engagement processes are characterized by the ability to modulate one's own position within complex social systems with many and different actors. The reflexive ability to differentiate social relations in a flexible way can be considered as one of most relevant aspects of engaged students. Moreover, according to Christenson et al. (2012), engagement cannot be conceptualized as a set of attributes of a single student, but rather as a modifiable state of being that is strongly influenced by the ability of the school, family and peers to provide consistent expectations and support for learning. Consequently, engagement should not be considered an individual quality of the student, but, rather, all 'engaging processes' are connected to the relational processes that develop over time and the students build the sense of their participation in life university and position their selves within different kinds of social relations with peers and teachers (Zhoc et al., 2019).

Third, and final, some authors suggest that academic engagement concerns the ongoing development of skills and competences in the awareness and reflective use of the academic training relationship, the ability to position itself in the university context in a manner consistent with one's own objectives, and to integrate the university project and its *value* into the wider life and work (Freda et al., 2016). This is relevant for our perspective and for our aims of research in as much as it leads us to consider the relevance of values, as social meanings that provide symbolic resources to achieve results in academic context. In particular, values allow students to share symbolic frames (Esposito et al., 2016; Salvatore, 2016) that orient and mediate their actions, behaviors, choices and sense of belonging in-between different contexts (university, family, leisure time, extra-academic activities).

Summarizing, starting from the above critique review of the literature on the different academic engagement perspectives, we will conceptualize academic engagement using the following *tentative* dimensions:

- 1) Perception of the university difficulties;
- 2) Persistence in the university choice;
- 3) Awareness of the university context;
- 4) Engagement with university peers;
- 5) Engagement with university professors;

- 6) Relationships between university and relational net;
- 7) Balance between University and private life;
- 8) Value of university;
- 9) Value of university course;
- 10) Value of being a university student;
- 11) Value of university for future professional life.

Before describing how we operationalized the above dimensions in a new instrument, we review in the following section the main tools that have been developed to measure the engagement construct in the university context.

### The Assessment of Engagement in the University Context

With the increase of studies in this field, great attention has been dedicated to the assessment of academic engagement in the university context. Schaufeli et al. (2002a, 2002b) developed an adaptation of the Utrecht Work Engagement Scale, the Utrecht Work Engagement Scale - Student version (UWES-SS), to measure academic engagement at university in the three dimensions of vigor, absorption, and dedication. Other examples of measures are the National Survey of Student Engagement (NSSE, 2016) and the Beginning College Survey of Student Engagement (BCSSE, 2013) which assessed academic engagement in first-year US college students. However, these measures have been criticized for their weak psychometric properties and for their focus on students' habits more than on the psychological features that underline the engagement construct (Campbell & Cabrera, 2011; Steele & Fullagar, 2009). For instance, Steele and Fullagar (2009) criticized the NSSE as being too broad in scope and essentially a self-report of educational experiences rather than a measure of engagement. Also, the issue of what these surveys measure is still controversial. For instance, Campbell and Cabrera (2011), assuming a five-factors model for the NSSE (Level of Academic Challenge, Active & Collaborative Learning, Student-Faculty Interactions, Enriching Educational Experience, Supportive Campus Environment) report low fit indices, poor alpha reliabilities and weak factor loadings for more than half of the NSSE items. However, NSSE and BCSSE advocates claim that the surveys do not measure latent constructs but rather benchmarks, which are the result of a hybrid process made by an exploratory factor analysis and expert judgment (McCormick & McClenney, 2012). Moreover, the authors conclude that the aim of these surveys is "to provide campus decision-makers with information that can inform educational improvement (p. 328)". From this brief review, the need for less controversial and psychometrically sound instruments to measure students' engagement at university level clearly arises.

To date, three studies focused on the university engagement construct from a psychological perspective, reporting

also the psychometric validation of the proposed scales. Maroco et al. (2016) developed the University Student Engagement Inventory (USEI). The USEI, according to Fredricks' conceptualization (2015), draws both on a first-order conceptualization of engagement as a multidimensional construct that includes behavioral, emotional and cognitive dimensions, and a second-order single construct (engagement) that is reflected in the three first-order dimensions. The USEI has been assessed for factorial validity, reliability, measurement invariance across genders and areas of study in Portuguese speaking students (Maroco et al., 2016; Sinval et al., 2018) and in nine different countries from Europe, North and South America, Africa and Asia (Assunção et al., 2020). Recently, an Italian validation of the USEI has also been developed (Esposito et al., 2021). Nevertheless, this measure was not developed by taking into account other important dimensions that, according to the literature reviewed above, may be considered relevant, such as the awareness of the university environment in which students interact and confront each other or the relationships between university and relational net through which students may share their university experience with families and friends. In an effort to address these issues, Zhoc et al. (2019) developed the Higher Education Student Engagement Scale (HESES). The HESES is a basically lighter version of the First Year Experience Questionnaire (FYEQ), developed by Krause and Coates (2008). The FYEQ features 61 items distributed across seven dimensions: (i) Transition (i.e., how students deal with the transition between school and university process); (ii) Academic (i.e., how students deal with managing their work at university); (iii) Peer (i.e., how students interact with peers); (iv) Staff (i.e., how students interact with faculty); (v) Intellectual (i.e., how students develop their cognitive foundations for academic success); (vi) Online (i.e., how students use web information and technologies to support their learning); and (vii) Beyond-class (i.e., how students' deal with related to extracurricular activities). The HESES, drawing from the conceptualization of students' engagement by Finn and Zimmer (2012) uses only 28 out of the 61 items and collapses the Academic and Online dimensions and the Peer and Beyond-class dimensions, resulting into a final 5-dimension structure. While valuable, these previous efforts show some limitations, both from the theoretical and the statistical viewpoints. First of all, from the theoretical point of view, none of these instruments include a measurement of the dimensions related to the students' ability to sustain the efforts to deal with the university difficulties and to the persistence in the academic choice. Moreover, the measure of the values-related dimensions (value of university, value of university course, value of being a university student, value of university for future professional life) is often limited to few items that do not fully capture the complexity of their role in the engagement-making process. Finally, in the HESES

instrument, the beyond-class engagement dimension is limited to extra-curricular activities and does not acknowledge the awareness of the academic context and its interactions with professional and personal life (namely, the relationships between university and private life).

From the statistical viewpoint, the HESES shows further issues. First, the choice of the 28 retained items from the FYEQ is criterion-based (i.e., to have at least 4 items for each latent construct) and not justified from the statistical viewpoint. Furthermore, different possible models with fewer dimensions were not investigated. Third, the validation of the HESES instrument was limited to factor structure, internal consistency and criterion validity, disregarding important measures as convergent, discriminant and construct-related validity. Finally, it is worth noting that none of the above instruments investigated the relationships between students' engagement and their actual academic achievement and confidence in their academic ability.

## Aims and Hypotheses

To address the issues detected above in previously developed instruments, this paper aims to analyze the psychometric properties, construct-related and criterion-related validity of a new questionnaire for the measurement of the academic engagement, which we call the SInAPSi Academic Engagement Scale (SAES). Specifically, we hypothesize to find: H1) a robust factor structure; H2) good convergent and discriminant validity of the factor structure; H3) adequate score distributions, acceptable factor statistics and good reliability of the scales; H4) adequate construct-related validity, namely a positive significant correlation with an existing and validated questionnaire of the academic engagement, as the USEI; H5) adequate criterion-related validity, namely positive significant correlations with students' academic motivation (H5a), confidence (H5b) and academic performance (H5c).

## Methods

### Development of the SAES Instrument

The development of the SAES instrument was coordinated by the SInAPSi (Services for active participation and inclusion of university students) center of the Authors' university, within the framework of the national project 'Piano Nazionale Lauree Scientifiche (PNLS)'. SInAPSi is a strategic center embedded in the university of the authors, and, recently, it has been evaluated as the flagship of the university.

At the beginning of the study, approval for conducting this study was obtained from the coordinators of the involved degree courses at the Authors' University. Administration of the

instruments was carried out in presence at the end of the lecture, after agreement with the course instructor.

To develop the initial version of the SAES instrument, we first drafted 77 items that operationalized the tentative dimensions described above. Eleven items were designed for the perception of the university difficulties and persistence in the university choice dimensions. Most of the items for these two tentative dimensions were newly developed for this study since we found that previous scales that concerned the related construct of perceived academic control (Perry et al., 2005) did not address explicitly the awareness of the encountered difficulties. Only few items were reformulated from the available scale of the perceived academic control as, for example *I feel I have the capability to overcome the difficulties I am experiencing* (original version: *The more effort I put into my study, the better I do in it*). However, due to the relationships between perceived difficulties and drop-out intention (Respondek et al., 2017), we included two items about the will to leave university from previous studies (Girelli et al., 2018a, b, e.g.: *Sometimes I think about leaving University*). We note that we also included items about the will to persist in the university choice as the following one: *Despite the difficulties I sometimes encounter in university life, I think it's worth continuing my studies*. Thirty-four items were developed to measure the awareness of the university context, engagement with university peers, engagement with university professors, relationships between university and relational net and balance between university and private life dimensions. As for the previous dimensions, most items were newly developed since prior scales did not address our conceptualization of the engagement in terms of relations, contextual frames and shareable experiences related to university. For instance, the Need for Relatedness at College questionnaire (Guiffrida et al., 2008) concerns the motivations for attending college that are related to meeting new friends, to help the family and to learn from experts. Hence, very few items can be loosely considered similar, as for instance *I like to meet friends at university* (original version: *I go to college to make new friends*). Examples of our newly developed items concerning the relationships with peers and family dimensions are: *I feel to be part of a learning community* or *I talk about my professional plan with my family*, respectively. Differently, few items for the engagement with university professors dimension were designed starting from the Learning Climate Questionnaire (Williams & Deci, 1996). Examples are: *My teachers respect me as a person* (original version: *I feel that my instructor accepts me*) and *I respect my university teachers* (original version: *I feel a lot of trust in my instructor*). The remaining thirty-two items concerned the value-related dimension. To develop some of the items we resorted to available motivation scales (as the intrinsic motivation inventory) since students' motivation can be considered as another influential factor for engagement. Prior studies have also

thoroughly shown that engagement is associated with the motivation (e.g., Alivernini et al., 2017; Appleton et al., 2008; Senior et al., 2018). Example items are: *The course of study I am attending is interesting* or *I like the course of study I'm attending*. Moreover, we also drafted some items to address the value of university in terms of future expectations, the identification in the desired professional role and the development of congruent skills. Since these constructs are recognized to be very closely linked to student motivation (Eccles, 2004; Ryan & Deci, 2000; Senior et al., 2018), we can infer that also engagement can be related to these constructs. Example items are: *I find my studies very significant for my professional plans* or *The course of study I'm attending is functional to the achievement of my professional goals*.

## Participants

The main sample (Group 1) of the present study was constituted by 680 students enrolled in the first academic year at the authors' University. Age distribution was the following: 18–20 (88.1%); 21–23 (9.3%); greater than 23 (1.6%). Female students were 53.4% of the sample. All students attended a scientific degree course: biology (39.3%); biotechnologies (7.0%); chemistry (14.0%); physics (16.2%); informatics (10.3%); mathematics (11.2%). About 2% of the students did not indicate the attended degree course. A convenience sample of biology and biotechnologies students (Group 2) was also involved to perform the confirmatory factor analysis of the initial factor structure of the SAES (see Data Analysis section). Group 2 included 312 students (73.7% females) of the third academic year at the same university. While we acknowledge that a second group from the same population of Group 1 would have been the ideal choice, the involvement of Group 2 from a slightly different population (namely, the majority of Group 1 students is from the same course of enrollment of Group 2), allowed us to collect a stronger evidence about the factor structure of the SAES. Group 1 students' socio-demographic background was quite heterogenous, ranging from a percentage of 21.6% of students with a very low socio-cultural background (i.e., both parents with mandatory school as highest instructional degree and low-rank profession) to a 17.8% of students with a very high value of socio-cultural background (i.e., both graduated parents with a highly remunerative or intellectual profession). Intermediate categories were populated as follows: medium-low: 29.6%; medium: 21.0%; medium-high: 10.0%. We note that Group 1 and Group 2 were equivalent according to socio-cultural background ( $\chi^2 = 1.668$ ;  $df = 4$ ,  $p = .796$ ).

Students were informed about the study and had to sign a consent form to participate to the study and agree to report their own course ID, which was used to match data obtained from the administration offices. Those who wished not to participate to the study were allowed to leave the room. It took

approximately 45 min for students to complete the SAES and concurrent measures.

## Independent Measures

In the following, we describe the independent measures used in this study for the construct-related and criterion-related validity of the SAES (see data analysis for more details).

*University student engagement inventory (USEI).* The Italian validation of the University Student Engagement Inventory (USEI; Esposito et al., 2021) was used to investigate the construct-related validity of the SAES. The USEI consists of 15 self-report items rated with a five-point Likert scale from ‘1-never’ to ‘5-always’. The behavioral dimension assesses students’ participation in classroom tasks and school-related extracurricular activities. The emotional dimension measures feelings of belonging to the university and positive and negative feelings related to professor and classmate interactions. The cognitive dimension assesses the students’ investment and willingness to exert the efforts for the comprehension of difficult ideas and skills. The reason for using USEI as a measure of the construct-related validity is that it is a reliable, albeit limited to fewer dimensions, measure of the engagement construct, validated also in Italian.

*Academic Motivation Scale (AMS).* The Academic Motivation Scale (AMS) was used to obtain evidence about the criterion-related validity of the SAES. The AMS was developed by Vallerand and Ratelle (2002) according to the Self-Determination Theory (SDT), which states that individuals have a psychological need for autonomy and there are diverse styles of regulation for student academic motivation. These styles of regulation can be positioned along a self-determination continuum ranging from amotivation to intrinsic motivation. The Italian validated version of the AMS (Alivernini & Lucidi, 2008) consists of five subscales; each scale includes four items and responses choices were rated on a 7-points Likert scale from 1 (does not correspond at all) to 7 (corresponds exactly). The five subscales are: a) amotivation, the lowest level of autonomy characterized by a lack of intention to act and the belief that behaviors are beyond the students’ control; b) external regulation, the second least self-determined behavior which is performed to satisfy an external demand or obtain an externally reward contingency; c) introjected regulation, a level positioned in the middle of the continuum, where behavior are controlled by internal reward contingencies, such as ego enhancement or guilt, or anxiety; d) identified regulation, a more autonomous form of motivation of student who attribute personal importance to the behavior; e) and intrinsic motivation, the most autonomous form of motivation that is when identified regulations have been assimilated to the

self as doing activities is related to an inherent satisfaction (Ryan & Deci, 2000). The AMS has previously been assessed for factorial validity, reliability, measurement invariance across genders and areas of study in English-and French-speaking students (Grouzet et al., 2006) and in Italian-speaking students (Alivernini & Lucidi, 2008; Alivernini et al., 2017; Girelli, Alivernini, Salvatore, et al., 2018a; Girelli, Alivernini, Lucidi, et al., 2018b). The reason for using AMS to test criterion-validity of the SAES is that prior studies have thoroughly shown that engagement is associated with motivation for learning (e.g., Appleton et al., 2008; Senior et al., 2018).

*Academic-related variables.* To obtain further evidence of the criterion-related validity of the SAES, the following academic-related variables were also concurrently measured for Group 1: i) confidence in one’s own preparation for academic studies; ii) number of obtained university credits (ECTS) after the first year of university course. Following prior studies carried out in Italy (Girelli, Alivernini, Lucidi, et al., 2018b), we used the latter variable as proxy for the academic performance. The reason for using these variables to measure the criterion-validity of the SAES is that engagement positively affects academic performance (Appleton et al., 2008; Lee, 2014; Salanova et al., 2010), which in turn is affected by confidence (Cordova et al., 2014; Stankov et al., 2014). Confidence score was calculated as the product of the scores obtained in two items (Conf\_Item1: “How do you assess the preparation you received at high school for the university course you have chosen?”, and Conf\_Item2: “How do you assess your achievement at high school?”) on a 1–5 Likert Scales and then normalized in the [0–1] interval. The reason for calculating the variable product instead of the average value of the scores in the two items was to better discriminate students with low scores in one of the items. Average value of normalized confidence score was quite high,  $0.60 \pm 0.23$  (st.dev.). Given that about 10% of the sample got the highest score, we decided to divide the sample for further analyses in two groups, using the median score (0.64) as criterion: average confident (score < 0.64; 68.5%); above average confident (0.64 < score; 31.5%). The number of ECTS was acquired from the university administration offices. For one academic year, ECTS range from 0 to 60. On average, for the students participating to this study, passing a single exam allows to acquire 9 ECTS. Italian national agency for the evaluation of university and research (ANVUR) suggests that a critical threshold for evaluating the performance for students enrolled in the first year of higher education is 40 ECTS. On such basis, for the present study, we identified three groups of students: low performers (ECTS < 20); average performers (20 < ECTS < 40); good performers (ECTS > 40).

## Data Analysis

While the tentative dimensions were helpful in the early design phase of the SAES, we decided not to be bound by our a-priori conceptualization of the literature, but rather, we preferred that the statistical analysis led to the final categorization of the items. This procedure has been adopted in prior studies on multi-dimensional instruments development and validation (e.g., Thomas et al., 2008) and was aimed at better capturing participant's views as represented by their responses to the SAES instrument.

As first step to test the factor structure of the SAES instrument, after re-scoring of reversely worded items, we performed an Exploratory Factor Analysis of the Group 1 students' responses to the 77 items to provide a preliminary factor structure of the SAES and identify its underlying dimensions. Factorability of the correlation matrix was checked through Bartlett's test of sphericity and the Kaiser–Meyer–Olkin measure of sampling adequacy. Principal axis factoring and non-orthogonal Promax rotation to allow for factors correlations were employed to extract the factors. Parallel analysis (Horn, 1965) was used to determine how many factors to retain. Items with factor loadings lower than or equal to 0.3 were then suppressed. Then, the resulting factor structure was tested through Confirmatory Factor Analysis on the Group 2 of the sample. The CFA provided further refinements to the items and factor structure that was again tested through a CFA with Group 1. Several indices were used to establish the quality of CFA model fit: chi-square/degrees-of-freedom ratio ( $\chi^2/df$ ), normed fit index (NFI), incremental fit index (IFI), comparative fit index (CFI), Tucker-Lewis index (TLI), root-mean-square error of approximation (RMSEA). Values of  $\chi^2/df$  less than 3, CFI, IFI, CFI, TLI above 0.90, RMSEA less than 0.05 are indicative of good model fit (Kline, 2005; Schreiber et al., 2006). Finally, score distributions, statistics and reliability were calculated for the final emerging factor scales to look for internal consistency of the SAES. Gender invariance of the factors were investigated through a *t-test*.

For validity testing of the SAES, we used the following levels of evidence: *convergent validity*, *discriminant validity*, *construct-related validity*, and *criterion-related validity*.

*Convergent validity*, namely the extent to which the items that are designed to measure a construct align well, was checked through the average variance extracted (AVE, acceptable values above 0.5) and composite reliability (CR, acceptable values above 0.7) indices (Fornell & Larcker, 1981).

*Discriminant validity*, namely the extent to which a construct is distinct from the other measured constructs, was checked by comparing, for each factor, the AVE with all the square inter-factor correlations (Hair et al., 2014).

To gather evidence about *construct-related validity*, which measures the extent to which the results obtained with the instrument to be validated are correlated to the results obtained from a different instrument that measures the same or a specific dimension of the construct, we first validated both the three-factor and the single factor structure of the USEI instrument using CFA with Group 1. The performed CFA shows a slightly better fit of the one-factor over the three-factor structure (USEI-1-factor:  $\chi^2_{min}=2.411$ ,  $df=70$ ,  $NFI=0.969$ ,  $TLI=0.972$ ,  $CFI=0.982$ ,  $RMSEA=0.046$ ;  $AIC=268.796$ ;  $BIC=494.900$ ; USEI-3-factor:  $\chi^2_{min}=2.717$ ,  $df=74$ ,  $NFI=0.963$ ,  $TLI=0.966$ ,  $CFI=0.976$ ,  $RMSEA=0.050$ ;  $AIC=293.074$ ;  $BIC=501.090$ ). On such basis, we decided to investigate the correlations between our instrument scales and both the 1-factor and the 3-factor structures of the USEI so to have a more detailed picture of the construct measured by the SAES.

*Criterion-related validity*, which indicates the extent to which the score obtained with the instrument correlates with variables that have a hypothesized relationship with the construct measured by the instrument (Cohen and Swerdlik 2005), was assessed through the: a) AMS and b) academic-related variables, namely confidence, as measured by participants 'self-reports and performance, measured through the acquired ECTS. For a), we first checked the five-factor solution of AMS using CFA with Group 1. The 5-factor structure of the AMS instrument showed a good fit to our data ( $\chi^2_{min}=2.730$ ,  $df=147$ ,  $NFI=0.956$ ,  $TLI=0.963$ ,  $CFI=0.972$ ,  $RMSEA=0.050$ ;  $AIC=527.362$ ;  $BIC=812.254$ ). For b), we investigated the relationship with academic confidence by comparing the SAES scores of the average confident and above average confident groups of students using a *t-test*, while the association with the academic performance was investigated by comparing the SAES scores of the low performers; average performers; and good performers through a *One-Way Analysis of Variance* (ANOVA).

## Results

### EFA of Initial Version of the SAES

Bartlett's test of sphericity ( $\chi^2=34,939.698$ ,  $df=2926$ ,  $p<.0001$ ) and the Kaiser–Meyer–Olkin measure of sampling adequacy ( $KMO=0.936$ ) indicate that EFA was appropriate for our sample (Group 1). The factor structure that emerged from the parallel analysis overlapped only partially with the initial design components, since only eight factors could be identified. Factor 1 (12 items, *Cronbach's alpha* = .84) condensed items from the following dimensions: value of university and value of being a university student. Based on this evidence, we called Factor 1 *University value and sense of*

belonging. Similarly, Factor 2 (11 items, *Cronbach's alpha* = .81) collapsed the perception of the university difficulties and the persistence in the university choice dimensions, hence we called this factor *Perception of the capability to persist in the University choice*. Factor 3 (10 items, *Cronbach's alpha* = .90) grouped items corresponding to the *value of university course* dimension. Factor 4 (7 items, *Cronbach's alpha* = .73) and Factor 5 (10 items, *Cronbach's alpha* = .83) grouped items corresponding to *Engagement with University Professors* and *Engagement with University peers*, respectively. Factor 6 (4 items, *Cronbach's alpha* = .74) and Factor 7 (6 items, *Cronbach's alpha* = .67) grouped items from the *Relationships between University and relational net* and *Awareness of the academic context* dimensions, respectively. Factor 8, which grouped 4 items of the *Balance between University and private life* dimension, was suppressed due to its low reliability (.60). Finally, other 13 items, including all the items that were designed for the *Value of university for future professional life* dimension, were suppressed due to low values of factor loading, resulting in an intermediate 7-factor, 60-item structure.

### CFA of SAES Structure

Initial CFA of the emergent factor structure of the SAES carried out on the Group 2 of the sample revealed a mediocre model fit ( $\chi^2_{min} = 1.677$ ,  $df = 1642$ ,  $NFI = 0.713$ ,  $IFI = 0.860$ ,  $TLI = 0.847$ ,  $CFI = 0.858$ ,  $RMSEA = 0.047$ ,  $AIC = 3248.856$ ). We hence investigated the standardized regression weights and removed from the analysis the items with weak loadings, namely weights lower than 0.5 (Kline, 2005; Ximénez, 2009). Twenty-three items were removed, and a new CFA was carried out. Model fit indices improved ( $\chi^2_{min} = 1.653$ ,  $df = 593$ ,  $NFI = 0.833$ ,  $IFI = 0.927$ ,  $TLI = 0.917$ ,  $CFI = 0.926$ ,  $RMSEA = 0.046$ ,  $AIC = 1274.203$ ). However, after the removal of items, one further factor (Factor 7 *Awareness of the academic context*) had to be eliminated due to low number of retained items (2). Moreover, to improve item balance among the factors, we carried out a parceling of items whose regression weights were lower than 0.6. We re-ran a CFA of the final 6-factor, 29-item structure with Group 2 of the sample finally obtaining a good model fit ( $\chi^2_{min} = 1.586$ ,  $df = 349$ ,  $NFI = 0.881$ ,  $IFI = 0.952$ ,  $TLI = 0.944$ ,  $CFI = 0.952$ ,  $RMSEA = 0.043$ ,  $AIC = 783.495$ ). Table 1 presents the final factor structure after the CFA, including correlations, AVE and CR. As shown in Table 1, all items have item loadings and item-total correlations greater than .40.

A graphical representation of the factor structure is depicted in Fig. 1.

Note that the CFA of this factor structure on Group 1 shows also a good model fit ( $\chi^2_{min} = 1.849$ ,  $df = 331$ ,  $NFI = 0.927$ ,  $IFI = 0.965$ ,  $TLI = 0.957$ ,  $CFI = 0.965$ ,  $RMSEA = 0.035$ ,

$AIC = 878.144$ ). The final 29 retained items are reported in Appendix A. (Insert Fig. 1).

### Score Distributions, Factors Statistics and Reliability

Scale statistics and reliability coefficients of the 29 retained items for both group 1 and group 2 are presented in Table 2. Overall, the factors showed satisfactory psychometric properties, including sufficient variation of scores, and good internal consistency (Cronbach's alpha). Factors' values of skewness and kurtosis indices were also good (less than |2|).

Table 3 reports the average score of female and male participants for each of the six factors of the SAES. Results show that gender differences are significant for three factors: Factor 3 (*Value of university course* – in favor of males), Factor 4 (*Engagement with University Professors* – males), and Factor 6 (*Relationships between University and relational net* – females).

### Evidence for Convergent Validity

For all SAES factors, except Factor 1 and 6, AVE values are above the .50 threshold, while all CR values, including that of Factor 1, were higher than the recommended .70 threshold (Nunnally, 1978). While not as satisfactory as expected, we note that also the AVE of the Factor 1 and 6 can be considered as acceptable since they are only slightly below .50 threshold, and their CR is above 0.70 (Fornell & Larcker, 1981). Overall, such evidence indicates good convergent validity of the instrument.

### Evidence for Discriminant Validity

For all factors except factor 1, all paired squared inter-factor correlations are lower than the respective AVE. For factor 1, AVE is very close to squared correlations with Factor 2 and Factor 3 and it is higher than the average shared variance (.29) with the other factors, so discriminant validity of the SAES constructs is also established.

### Evidence for Construct-Related Validity

Correlations between each factor scale of the SAES and the three factors of the USEI for Group 1 are reported in Table 4. All correlations are positive, and moderate in magnitude, indicating a good construct validity of the emerging factors of the SAES. The highest measured correlations are those between the Emotional Engagement dimension of USEI and Factor 2, (.44), Factor 3, (.45) and Factor 1, (.42). Slightly lower correlations were measured between the latter Factor 1 and the other two USEI dimensions, namely Behavioral engagement (.36) and Cognitive Engagement (.36). The lowest correlations are



**Table 1** Cronbach's Alpha, standardized factor loadings, item-total correlations, latent correlations, average variance extracted and composite reliability for each of the SAES Factors (group 2,  $N = 312$ )

Factors	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
1. University value and sense of belonging (.83)						
Item 1	.756 (.67) <sup>a</sup>					
Item 2	.736 (.57)					
Item 3	.707 (.63)					
Item 4	.665 (.66)					
Item 5	.590 (.52)					
Item 6	.498 (.53)					
2. Perception of the capability to persist in the University choice (.81)						
Item 7		.806 (.70)				
Item 8		.710 (.62)				
Item 9		.688 (.61)				
Item 10		.670 (.58)				
3. Value of University course (.90)						
Item 11			.795 (.73)			
Item 12			.783 (.71)			
Item 13			.758 (.65)			
Item 14			.750 (.70)			
Item 15			.747 (.76)			
Item 16			.723 (.67)			
Item 17			.683 (.72)			
4. Engagement with University Professors (.82)						
Item 18				.849 (.70)		
Item 19				.807 (.64)		
Item 20				.600 (.63)		
Item 21				.565 (.61)		
5. Engagement with University peers (.83)						
Item 22					.869 (.76)	
Item 23					.784 (.70)	
Item 24					.703 (.63)	
Item 25					.678 (.62)	
Item 26					.531 (.49)	
6. Relationships between University and relational net (.78)						
Item 27						.830 (.78)
Item 28						.770 (.61)
Item 29						.411 (.49)
Factor Correlations, AVE and CR	1	2	3	4	5	6
1. University value and sense of belonging	.44 <sup>b</sup> (.82) <sup>c</sup>	.45** <sup>d</sup>	.45**	.11**	.15**	.26**
2. Perception of the capability to persist in the University choice		.52(.81)	.30**	.10**	.05**	.15**
3. Value of University course			.56(.89)	.10**	.11**	.20**
4. Engagement with University Professors				.51(.80)	.03*	.05*
5. Engagement with University peers					.52(.84)	.16**
6. Relationships between University and relational net						.48(.72)

Note: All factor loadings were statistically significant at  $p < 0.001$

<sup>a</sup> Item-Total Correlations

<sup>b</sup> Average Variance extracted (AVE)

<sup>c</sup> Composite reliability (CR)

<sup>d</sup> Squared correlations between factors

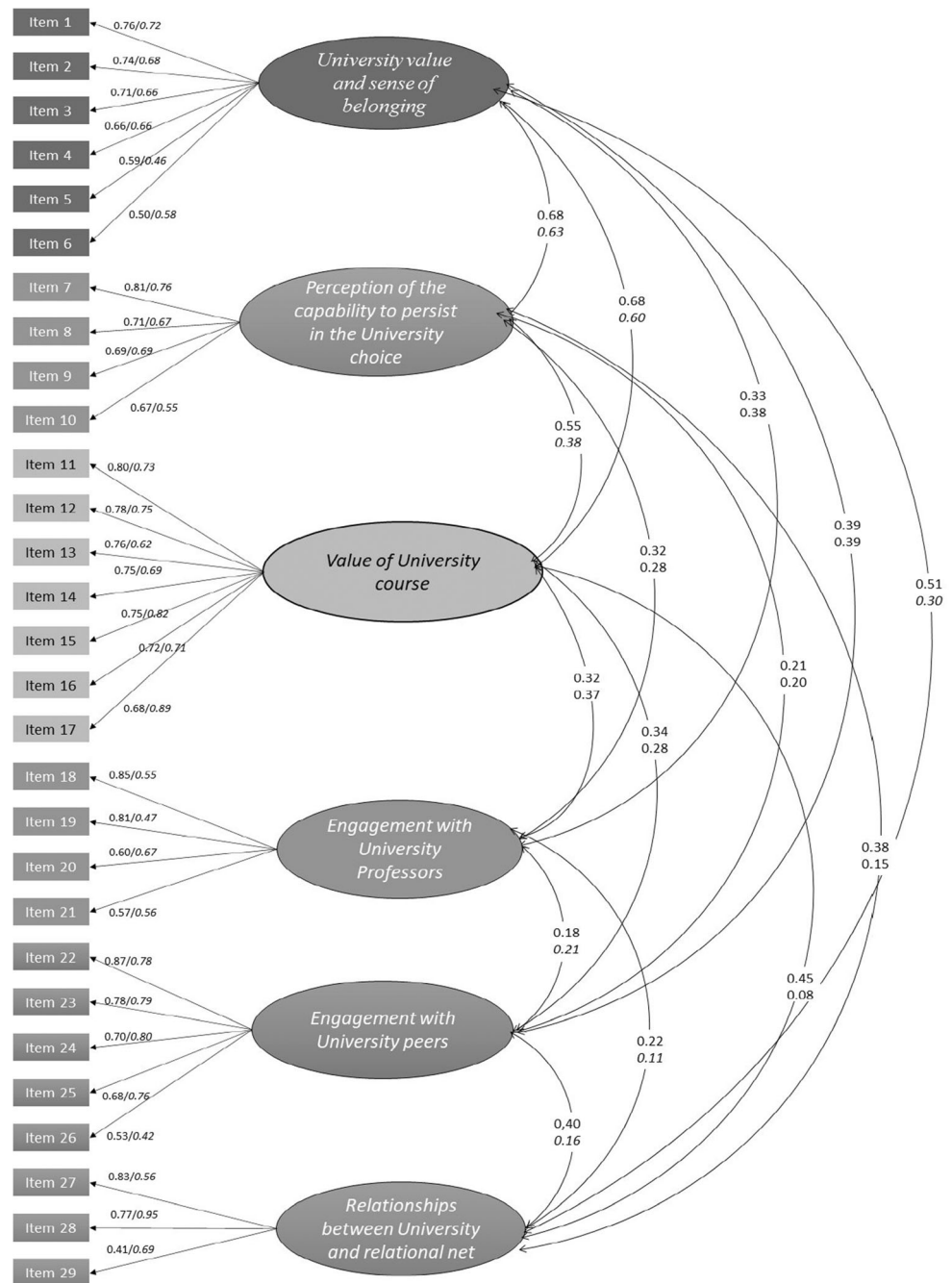
\*\*  $p < 0.01$

\*  $p < 0.05$

those between the USEI Emotional Engagement dimension and Factor 6, (.16) and between the USEI Behavioral engagement dimension and Factor 4 (.16).

Correlations between the second-order, 1-factor of USEI and the six emerging factors range from a minimum of .19 (*Factor 4*) and a maximum of .36 (*Factor 1*).

**Fig. 1** Path diagrams for the CFA of the SAES for Group 1 (*in italic*) and Group 2. Regression values are standardized. Two headed arrows represent the correlations of the SAES factors



**Evidence for Criterion-Related Validity: Correlation with Academic Motivation**

Table 4 reports also the correlations between the six factors and the five dimensions measured by the AMS questionnaire.

Results show that the correlations increase when moving from amotivation to intrinsic motivation, thus indicating that academic engagement increases with autonomous forms of motivation., as expected. In particular, correlations between

amotivation and external regulation and the six factors are all negative and significative, Factor 2 being the most correlated factor with these two dimensions (-.57 and -.36, respectively). Correlations between introjected motivation and the six factor are mostly not significant (the only significant correlation is with Factor 3, .21), while correlations between identified and intrinsic motions and the six factors are all positive, Factor 3 being the most correlated factor with these dimensions (.57 and .62, respectively).

**Table 2** Score distributions, descriptive statistics and reliability of SAES factors

Factor	N	M	SD	Skewness (SE)	Kurtosis (SE)	Alpha
1. University value and sense of belonging						
Group 1	680	4.08	.59	-.47 (.09)	-.03 (.19)	.80
Group 2	312	4.11	.64	-.53 (.14)	-.45 (.27)	.83
2. Perception of the capability to persist in the University choice						
Group 1	680	4.20	.71	-1.2 (.09)	1.5 (.19)	.74
Group 2	312	4.09	.83	-1.2 (.14)	1.2 (.27)	.81
3. Value of University course						
Group 1	680	3.83	.75	-.50 (.09)	.55 (.19)	.90
Group 2	312	3.91	.72	-.32 (.14)	-.60 (.27)	.90
4. Engagement with University Professors						
Group 1	680	3.22	.66	.00 (.09)	.37 (.19)	.70
Group 2	312	2.89	.76	.17 (-.14)	.25 (.27)	.82
5. Engagement with University peers						
Group 1	680	3.73	.79	-.64 (.09)	.35 (.19)	.82
Group 2	312	3.69	.83	-.59 (.14)	.17 (.27)	.83
6. Relationships between University and relational net						
Group 1	680	3.12	.97	.02 (.09)	-.50 (.19)	.76
Group 2	312	3.27	.98	-.15 (.14)	-.68 (.27)	.78

### Evidence for Criterion-Related Validity: Correlations with Academic Confidence and Performance

Concerning the confidence variable, we found that above average confident students ( $N=214$ ) scored significantly higher than average confident students ( $N=466$ ) in all factors ( $t > 2.451$ ,  $df=678$ ,  $p < .01$ ) except Factor 5 ( $t = 0.660$ ,  $df=678$ ,  $p > .05$ ). Concerning the academic performance (see Table 5), the one-way ANOVA shows that differences in raw scores of the SAES Factors 1, 2, 3 and 6 are significantly different for the three groups of performers. More specifically, raw average scores of Factors 1 and 3 of good performers, namely students with more than 40 out of 60 ECTS, are significantly higher than those of the other students (Factor 1:  $t = 4.373$ ,  $df=677$ ,  $p < .0001$ ; Factor 3:  $t = 2.992$ ;  $df=677$ ;  $p < .01$ ). Similarly, the average scores in Factor 2 and Factor 6 of low performers, namely students with less than 20 out of 60 ECTS, are significantly lower than those of the other students (Factor 2:  $t = 4.773$ ,  $df=677$ ;  $p < .0001$ ; Factor 6:  $t = 4.157$ ,  $df=677$ ;  $p < .0001$ ).

### Discussion

Despite the growing interest in academic engagement and its relevance for students' success, there is a strong need for validated measures for assessing it in higher education, also in the Italian university system where, to our knowledge, only one

valid and reliable instrument has been developed which mainly limited to track no more than three dimensions of the academic engagement (e.g., behavioral, emotional and cognitive).

This study tried to overcome this lack of instruments in the literature by presenting the development and validation of a new questionnaire, the SAES, for the measurement of the academic engagement. Overall, these findings showed that the SAES can produce valid and reliable data on academic engagement. In particular, regarding the first hypothesis, results from the EFA and CFA suggested a robust factor structure of the SAES. After the exploratory and factor analysis, the initial tentative dimensions were reduced to a six-factors model with a 29-item structure that presented the best fit and seemed to detect very important dimensions of the engagement construct: *University value and sense of belonging*, *Value of University course*, *Perception of the capability to persist in the university choice*, *Engagement with the university professors*, *Engagement with the university peers*, *Relationships between University and relational net*. While the scale reduction and item deletion process lead to a factor structure that is different to that envisaged at the beginning, the six retained factors are clearly related to the a-priori identified constructs and, as such, to the relevant themes in the engagement literature, namely, the importance of values related to the specific context in which engagement happens (in our case, the university), the relationships between university

**Table 3** Mean scores in the six-factor scale for gender variable (group 1,  $N=680$ )

Factor	N	M	SD	t (df)
1. University value and sense of belonging				
Females	363	4.09	.55	.818(635.356)
Males	317	4.06	.63	
2. Perception of the capability to persist in the University choice				
Females	363	4.25	.68	1.839(678)
Males	317	4.15	.75	
3. Value of University course				
Females	363	3.72	.77	-4.135(678)***
Males	317	3.95	.71	
4. Engagement with University Professors				
Females	363	3.14	.62	-3.654(678)***
Males	317	3.32	.69	
5. Engagement with University peers				
Females	363	3.71	.78	-.662(678)
Males	317	3.75	.81	
6. Relationships between University and relational net				
Females	363	3.30	.98	5.183(678)***
Males	317	2.92	.91	

\*\*\*  $p < .0001$

**Table 4** Bivariate correlations between SAES factors and external instruments (group 1, *N* = 680)

External measure	1. University value and sense of belonging	2. Perception of the capability to persist in the University choice	3. Value of University course	4. Engagement with University Professors	5. Engagement with University peers	6. Relationships between University and relational net
USEI – Behavioral Engagement	.36**	.32**	.20**	.16**	.30**	.28**
USEI – Emotional Engagement	.42**	.44**	.45**	.27**	.34**	.16**
USEI – Cognitive Engagement	.36**	.26**	.29**	.19**	.25**	.23**
USEI – One factor	.49**	.44**	.40**	.26**	.38**	.28**
AMS – Amotivation	-.37**	-.57**	-.29**	-.06	-.14**	-.14**
AMS - external regulation	-.24**	-.36**	-.15**	.01	-.16**	-.04
AMS – introjected motivation	.07	-.08*	.21**	.03	.03	.12**
AMS – identified motivation	.44**	.29**	.57**	.18**	.20**	.22**
AMS – intrinsic motivation	.45**	.38**	.62**	.26**	.28**	.12**

\*\* *p* < .01; \* *p* < .05

and relational net and the perceived academic control. The retained factors may be considered innovative for some reasons. At first, differently from previous questionnaires on AE, the SAES can capture a higher variability of the construct, pointing out the role of the university as an important value on one hand, and of a life-choice on the other. In other words, the SAES recognizes the important role of the students' commitment and investment in the university path, which is a dimension partially ignored in the previous questionnaires presented in the literature. Furthermore, the SAES detects in a more complete way the quality of the relationships both with the university professors and the peers which strongly contribute to the students' persistence and highly prevent students' drop-out. Finally, it is interesting to underline the relevance of an innovative dimension of the SAES, namely the relationships between university and relational net. This factor detects how students can move in a flexible way between contexts, namely how they can represent themselves with multiple roles (son, friend, student) demonstrating how they can be felt within interchangeable contexts where one can force the others in a circular and productive relationship. Matching different roles is an important developmental task for university students and many of them failed in reaching an adequate integration between them. This SAES dimension may allow to easily investigate the ability of the students in facing this developmental task.

Concerning the second hypothesis, analysis of AVE, CR and squared correlations suggested a good convergent and discriminant validity of the SAES as for all SAES instrument

**Table 5** Mean scores and standard deviations of the six-factors raw scores for the three groups of students with different academic performance (low, average, good)(*N* = 680)

Factor	N	M	SD	F (df=2; 677)
1. University value and sense of belonging				
Low performers	200	3.95	.63	11.120**
Average performers	287	4.07	.58	
Good performers	193	4.23	.53	
2. Perception of the capability to persist in the University choice				
Low performers	200	4.01	.80	12.289**
Average performers	287	4.23	.69	
Good performers	193	4.35	.60	
3. Value of University course				
Low performers	200	3.77	.75	4.513*
Average performers	287	3.77	.77	
Good performers	193	3.97	.70	
4. Engagement with University Professors				
Low performers	200	3.25	.68	0.331
Average performers	287	3.20	.66	
Good performers	193	3.22	.65	
5. Engagement with University peers				
Low performers	200	3.64	.83	1.936
Average performers	287	3.76	.77	
Good performers	193	3.78	.78	
6. Relationships between University and relational net				
Low performers	200	2.89	.99	8.759**
Average performers	287	3.19	.96	
Good performers	193	3.27	.91	

\* *p* < .005

\*\* *p* < .0001

factors, except Factor 1 (University value and sense of belonging), AVE values are above the .50 threshold indicating acceptable convergent validity. Furthermore, all CR values were higher than the recommended .70 threshold, demonstrating acceptable reliability of each factor. These findings are consistent with the adequate evidence of the six-factors model validity and showed that the six dimensions of academic engagement are correlated, measure different aspects of the same construct and each of them is particular sensitive in measuring the specific dimension is intended to detect. Moreover, concerning the third hypothesis, the SAES showed satisfactory psychometric properties, including sufficient variation of scores, and good internal consistency as measured by Cronbach's alpha, as well as good factors values of skewness and kurtosis indices. Indeed, the scales' distributional coefficients are indicative of appropriate psychometric sensitivity as they are expected to follow an approximately normal distribution in the population under study.

With regard to the construct-related and criterion-related validity (fourth and fifth hypotheses), it was found a positive correlation with the USEI dimensions. In particular, the results showed positive and moderate correlations with both the USEI 3-factors and 1-factor model demonstrating that the SAES can detect some important dimensions of the academic engagement, such as the behavioral, emotional and cognitive dimensions. As all correlations are positive, these results indicate good construct-related validity of the emerging factors of the SAES.

As far as the correlations with the AMS are concerned (Hypothesis H5a), findings showed that all the SAES' factors were positively correlated with the most autonomous forms of motivation (intrinsic and identified motivation), while they were negatively correlated with the less autonomous forms of motivation (amotivation and external motivation). It is also interesting to note that, except for Factor 3 (Value of University course), the SAES factors were not correlated with the introjected subscale of the AMS. As this is a 'borderline' subscale positioned in the middle of the self-determination continuum, it was plausible to expect neither relation with the SAES scores. It is important to underline that this is an important finding as many studies have proven that academic engagement is associated with the students' motivation (e.g., Appleton et al., 2008; Senior et al., 2018) and that some motivational antecedents may encourage academic engagement (Wang & Eccles, 2013; Wang & Holcombe, 2010). This implies the possibility to adopt the SAES for evaluating university interventions aimed at improving academic engagement and students' retention, by also assessing if such interventions promote more autonomous forms of students' motivation. Finally, the SAES is positively correlated with the students' confidence in their preparation for academic studies (Hypothesis H5b) and their academic performance (Hypothesis H5b). Concerning the confidence variable, we

found that above average confident students scored significantly higher than average confident students in all factors, except Factor 5 (Engagement with University peers). Concerning academic performance, high scores of the SAES are positively correlated with academic performance, except for Factor 4 (Engagement with University Professors) and Factor 5 (Engagement with University peers). On the contrary for Factor 1 (University value and sense of belonging) and Factor 3 (Value of University course), the score of high performers is significantly higher than that of the other students, while for Factor 2 (Perception of the capability to persist in the University choice) and Factor 6 (Relationships between University and relational net), the score of low performers is significantly lower.

Overall, these results indicate also a good criterion-related validity of the SAES, namely academic engagement measured by the SAES works as a relevant variable with a strong association with important academic variables.

## Limitations

Although the analysis showed adequate psychometric qualities of data gathered with the SAES, there are some limitations of this study that should be mentioned. For example, this is a cross-sectional study, and it did not consider that academic engagement is a complex process along the academic path and that levels of student engagement may vary based on the students' experiences. Academic engagement develops itself over time through transitions, experience and sharing with others and it is important to recognize that these aspects cannot be ignored. Thus, future studies should plan longitudinal research designs with students from different graduation years in order to verify if the SAES may be a valid and reliable measure of engagement also during the academic life span or along with interventions aimed at improving students' retention and academic success.

A second limitation regards the involvement of solely Italian students. While this is a limitation in common to other validation studies in the engagement research field, we acknowledge that a transnational validation would have improved the obtained results.

Third, the self-report nature of the data collected; future research should consider hetero-evaluations and further students' records regarding their academic performance (e.g., average grade obtained in the exams, delays in passing exams, etc.). Other possible improvements regard the study of academic engagement as a possible predictor of students' well-being and as a mediator of the relationship between students' motivation and academic success.

A fourth limitation concerns the age of our sample which was composed of students enrolled in the first year of their degree course. As shown, some items regarding the students'

professional development have been eliminated, as well as Factor 8, which regarded the balance between university and private life (Factor 8), was suppressed due to its low reliability. It is plausible to hypothesize that older students may have reported different scores as the relationship between university and private life may be felt as a significant concern more for older students.

Finally, the sample was composed only by students enrolled in the scientific degree courses. Future research should consider students coming from different areas of study and evaluate the extent to which engagement is content-specific, or it represents a general engagement tendency among different groups.

## Conclusions

This study has shown that the SAES is a valid and reliable tool to assess academic engagement. Results showed that the SAES presented an adequate factorial construct validity, and a good construct-related and criterion-related reliability, being positively correlated with already existing measures of academic engagement and with students' academic motivation, confidence and performance.

Overall, the findings of the present study showed that the SAES can become an useful inventory for education and psychology researchers to analyze the relationship between the different types of academic engagement and other academic variables important for student adjustment and academic achievement.

From a theoretical perspective, this study has the following implications. First, findings show that academic engagement is a multidimensional construct made up by six dimensions that capture the ability of the students to invest in relationships with peers and professors, their commitment in the university choice and their capability to consider the university context as connected in a productive way with other spheres of their life. 'Engaged students' are not just students who simply attend and participate in lessons, but they sustain efforts, commitment, self-regulate behaviors and choices; they are also able to negotiate and share their goals with others (relatives, peers, friends), they can autonomously decide the university degree course and persist in their choice. To the latter concern, the multidimensionality of engagement well aligns also with prior studies in the literature (e.g. Hardrè & Reeve, 2003), where intention to dropout is the result of a multiplicity of factors, related on one's motivation and perceived competence, as well as on the students perceived values of their curriculum and their degree course. Hence, one of the strengths of the SAES is that it allows to investigate these important dimensions of AE within a single instrument. Furthermore, from our perspective, the SAES contributes to detect another important aspect of the academic engagement,

namely the role of context. Indeed, the context provides a social framework that enable the constructions of social relations. As stated, academic engagement cannot be conceptualized as a set of attributes of a single student, but rather as a modifiable state of being that is strongly influenced by the ability of the school, family and peer to provide consistent expectations and support for learning (Christenson et al., 2012).

University seems to be felt by engaged students as an important context strictly connected with the other contexts of their life. Despite these aspects were partially detected by other questionnaires, we believe that the SAES clearly aims to analyze them as important constituents of the academic engagement.

This study may have also some practical implications. The SAES may be considered a tool that produces data with good psychometric properties; that can predict relation with other academic variables. This is an important implication since the SAES may be useful to assess interventions aimed at enhancing students' engagement, motivation, and university achievements. Increasing engagement is fundamental for educational psychologists, school counselors as well as education policymakers. Furthermore, the SAES offers some important advantages: it is a short tool that can be administered easily for groups or large-scale assessments. It may be used both for assessing interventions that contrast the drop-out of university students and for implementing further research in the field of students' academic success, retention, and motivation.

## Appendix 1

### Final Retained Items of the SAES Instrument

#### Factor 1. *University value and sense of belonging*

1. I think University is good for me
2. Despite the difficulties I sometimes encounter in university life, I think it is worth continuing my studies
3. Going to University is a great opportunity for me
4. University has a great importance in my life
5. I take University education seriously
6. University engagement is part of my life plans

#### Factor 2. *Perception of the capability to persist in the University choice*

7. I'd leave University right away if I had an alternative (R)
8. Sometimes I think about leaving university (R)
9. I'd better do other things than go to University (R)
10. In my opinion, University education is not worth all the time, money and effort it takes me (R)

### Factor 3. Value of University course

11. I'm sure the degree course I'm attending is the right place for me
12. The course of study I'm attending is an opportunity for me
13. I am convinced that my decision to enroll in this University was the right one for me
14. I find my studies very significant for my professional plans
15. I like the course of study I'm attending
16. The course of study I'm attending is functional to the achievement of my professional goals
17. The course of study I'm attending is interesting

### 4. Engagement with University Professors

18. My teachers are interested in my opinions and what I say
19. My teachers respect me as a person
20. Teachers are usually available to discuss my work
21. Teachers clarify what they expect of us students

### 5. Engagement with University Peers

22. I feel like I'm part of a group of friends at university
23. I like to meet friends at university
24. I've made meaningful friends with some college colleagues
25. I have good relationships with my university colleagues
26. Studying with other students is useful to me

### 6. Relationships between University and Relational Net

27. I talk about my professional plans with my friends
28. I talk about my professional plans with my family
29. I discuss with my family about my University path

**Acknowledgements** A special thanks to the operators, civil volunteers of the SInAPSi center and the coordinators of the national project "Piano Nazionale Lauree Scientifiche" (PNLS). They all have actively and effectively contributed to the execution of the project.

**Funding** Open access funding provided by Università degli Studi di Napoli Federico II within the CRUI-CARE Agreement.

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