The Role of Personal Resources in Buffering College Student Technostress during the Pandemic: A Study Using an Italian Sample

Emanuela Ingusci [1], Enrico Ciavolino [1], Fulvio Signore [2,*], Margherita Zito [3], Vincenzo Russo [3] and Chiara Ghislieri [4]

1   Department of Human and Social Sciences, University of Salento, Studium 2000, Building 5, Via di Valesio, 73100 Lecce, Italy; emanuela.ingusci@unisalento.it (E.I.); enrico.ciavolino@unisalento.it (E.C.)
2   Department of Humanities, Letters, Cultural Heritage and Educational Studies, University of Foggia, Via Arpi 155/176, 71121 Foggia, Italy
3   Department of Business, Law, Economics and Consumption, Faculty of Communication, IULM University, 20143 Milan, Italy; margherita.zito@iulm.it (M.Z.); vincenzo.russo@iulm.it (V.R.)
4   Psychology Department, University of Turin, Palazzo Badini, Via Verdi 10, 10124 Turin, Italy; chiara.ghislieri@unito.it
*   Correspondence: fulvio.signore@unifg.it

Abstract: Given the upheavals that characterize the world of higher education and the recent literature on the subject, the examination of what can improve student well-being has become critical. The JD-R model, originally developed to explain the implementation of motivational processes and the simultaneous unfolding of mechanisms that impact health, is used to contextualize the processes that occur in higher education systems. Objective. The purpose of this paper is to examine the role of personal resources such as optimism and self-efficacy in increasing academic engagement and as protective factors against technostress. Method. A SEM model was implemented using MPLUS 7 and Jamovi on a sample of 421 university Italian students. They completed an online self-report questionnaire during the height of COVID-19 (May–November 2021) while taking online courses and were predominantly female (64.4%) and full-time academic students (87.6%) with a mean age of 24.6 years. Direct and indirect effects were estimated, accounting for the mediating role of academic engagement. Results. The results indicate that both self-efficacy and optimism have direct and negative effects on technostress. Self-efficacy, in turn, significantly increases academic engagement, whereas optimism has no effect on it. Finally, academic engagement appears to reduce the impact of technostress on the lives of students involved in the study, confirming its mediating role in reducing technostress. Conclusions. This study provides numerous important clues and insights into improving academic performance and well-being, as the use of personal resources can have important implications for avoiding the negative consequences of technology.

Keywords: JD-R model; self-efficacy; optimism; academic engagement; technostress; university

1. Introduction

The motivational processes and academic performance of college students have been increasingly studied in recent years (Bailey and Phillips 2016; Signore et al. 2019; Guppy et al. 2022). Given the multiple changes that have also occurred recently, such as the COVID-19 pandemic, universities are more and more concerned with satisfying the welfare of the various stakeholders within them, including academics, administrative staff, and students, which is necessary and even desirable (Cortese 2003). According to this view, the period of forced shutdown during the height of the COVID-19 pandemic resulted in an exponentially growing phenomenon. Stress due to technology use or technostress is defined as "the stress experienced by users due to application multitasking, constant connectivity, information

overload, frequent system upgrades and resulting uncertainty, constant relearning and resulting work-related uncertainties, and technical problems related to organizational use of ICT" (Tarafdar et al. 2011). Although this phenomenon has been studied mainly in the world of work, the recent literature is beginning to examine its effects in education as well (Qi 2019; X. Wang et al. 2020). Students are an important part of the college environment, not only in terms of marketing and consumers (Maqsood et al. 2021): from this perspective, the goodness of the overall structure, teaching, and quality of the institution directly affects student satisfaction and performance. In addition to purely organizational factors, students' personal resources and their interaction with the underlying dynamics of activity management also have a significant impact on student performance indicators. Personal resources refer to characteristics of a person's self that are often associated with resilience and indicate the ability to successfully control and cope with the environment (Bakker and Demerouti 2017).

As part of higher education institutions, universities play an important role in students' personal, professional, and career development. Creating healthy universities, institutions whose goal is to develop learning environments and organizational cultures to promote the health, well-being, and sustainability of their community, is currently considered a goal for improving college environments (Holt and Powell 2017; Di Fabio 2017). This strategy is based on the concept of linkages and connections among the many components of the college system. Improving the health profiles of students, faculty, and communities by developing personal competencies that support learning and provide people with the skills they need to respond to and cope with factors of wellness is one of the most important goals of healthy universities (Dooris and Doherty 2010). A holistic, multi-component, and comprehensive strategy is likely to be more successful than isolated and fragmented interventions, according to promising findings from studies of healthy universities in general (Knight and La Placa 2013; Mark Dooris et al. 2016). Thus, within this framework, students are encouraged to use their personal resources to become proactive and independent and to develop a sense of initiative and self-management skills throughout their academic experience to achieve success (Danilowicz-Gösele et al. 2017; Weber et al. 2019). Moreover, in this crisis setting, students should be helped in strengthening their personal resources, because studies have shown that high levels of attachment anxiety are positively associated with stress and negatively associated with altruistic behavior. This situation would be related to increased social distancing, depression, and feelings of anxiety and would be responsible for decreased perceptions of support and attention, leading students and young people (who generally have less powerful tools for coping with crises) to perceive themselves as unlovable and incompetent (Gallè et al. 2020). This problem of academic engagement and achievement should be carefully monitored. Moreover, this issue is particularly important because students' motivation needs to be monitored: If they perceive themselves as competent and therefore can use their personal resources, they will be able to accomplish their academic tasks (Cortese 2003). Indeed, student motivation seems to be particularly related to social skills and assertiveness (Cortese 2003), which are crucial for coping with the crisis of the pandemic and proactively addressing academic and life issues.

As consequence of the COVID-19 pandemic, the college educational environment changed significantly. Forced closures, social exclusion, restrictions, and the loss of traditional teaching methods have had a devastating impact on students, leading to increased levels of stress, anxiety, and poorer psychological well-being. Indeed, studies on this topic confirm that during the height of the pandemic, students developed increased anxiety and depression due to forced isolation from their social networks (Sahu 2020). Consequently, the drastic change brought about by the epidemic has led to a major rethinking of how to promote adaptability to the imposed change while ensuring the procedures critical to the academic success of college students, such as the achievement of their academic goals (Clough and Strycharczyk 2015; Bandura 1997).

Due to the previously stated theoretical, historical, and social framework, there is interest in topics such as student well-being in academic settings, including crucial aspects such as the influence of personal resources on satisfactory academic performance and the engagement that students demonstrate in their academic careers. Exploring the characteristics that can have a direct impact on the variables related to academic performance has long been crucial, as it allows for organizing and planning a backbone in higher education institutions that can improve students' lives and well-being (Cortese 2003). Several theoretical models have been developed to understand the emergence and maintenance of motivational processes in students' lives in higher education.

The Job Demands–Resources Model (JD-R) is a theory that explains how efficiency and well-being in different environments can be the result of two different types of situations, namely demands and resources (Bakker and Demerouti 2017). The way these two elements interact determines how well-being and job performance develop and how burnout behaviors manifest. Job demands include occupational processes that are physically and mentally demanding when they exceed the worker's adaptive capacity, such as workload (Bakker and Demerouti 2017). On the other hand, job resources refer to the physical, psychological, social, or organizational aspects of work that can reduce the physical and psychological stress of job demands and increase the potential for learning and growth, such as psychological capital (Bakker and Demerouti 2014; Zeijen et al. 2021). Pressure and motivation are two psychological mechanisms that link the two different components of the model. When job demands lead to a lack of energy and health problems, this can quickly lead to mechanisms that affect health processes (Bakker and de Vries 2021) On the contrary, when workplace resources are important, they can lead to high levels of engagement and good performance by increasing motivation (Zeijen et al. 2021).

The job demands and resources model (Bakker and Demerouti 2014, 2017; Demerouti et al. 2001), which originally focused on the predisposing factors of purely work-related organizational well-being and quality of life (Brondino et al. 2022), has received increasing attention from scholars (Ingusci et al. 2020; Zeijen et al. 2021). In particular, this model could provide a vantage point to examine all those dynamics of well-being and motivation for learning and education that, on the one hand, are guided by the same constructs (requirements, resources, academic engagement, performance, job crafting, student burnout, and indicators of unwellness), but, on the other hand, may be "tailored" with respect to specific contexts (requirements, resources, and indicators of performance/unwellness are, in fact, defined according to the characteristics of the workplace, the workers, and the organization). Based on these assumptions, the aim of this paper is to explore how, in times of an "established" pandemic, the role of personal resources can be understood in terms of predisposing factors for student well-being, particularly in relation to academic engagement and the effects of technostress.

In line with the aim of this study and by exploring these points, this study helps us identify and focus on elements that can improve academic performance and well-being. In addition, this study highlights the role of personal resources in preventing negative consequences of technology use, such as technostress. More importantly, this study presents a new viewpoint that looks at the role of personal resources differently, suggesting that skills that can be trained and developed can play a more critical role in engagement and performance than dispositional ones. These considerations of training resources make them strategic elements for student growth, learning, and success.

2. Theoretical Background

2.1. Personal Resources and Academic Engagement: The Role of Self-Efficacy and Optimism

The construct of engagement is an important aspect in various fields of psychology, social sciences, and education. Interest in this concept is closely related to the growing recognition that personal and active participation in social and institutional contexts is a key factor in all processes that promote productivity, health, and well-being. This construct has recently been explored in academic contexts because of its centrality in determining

and implementing critical processes such as motivation (Martínez et al. 2019; Perkmann et al. 2021) and has quickly become one of the most important processes for examining student well-being and participation processes. Conceptually, academic engagement has been described as the "investment and engaging behavior in student learning processes" (Cheon et al. 2020). Student engagement is generally associated with a positive attitude toward one's study activities and demonstrates and develops resources in the form of diligence, activity, and initiative.

There is evidence of a positive relationship between academic engagement and positive personal resources such as self-efficacy and optimism (Martínez et al. 2019; Vizoso et al. 2018; Sabbaghi et al. 2020). Self-efficacy and optimism are part of what has been termed "psychological capital" or simply PsyCap, i.e., a multidimensional construct that has received increasing attention in recent decades. Psychological capital is a central construct of positive organizational behavior and is defined as "the state of positive psychological development of an individual characterized by: (a) confidence (self-belief) in making the necessary effort to successfully accomplish challenging tasks; (b) positive attribution (optimism) regarding present and future success; (c) persistence in the pursuit of goals and, when necessary, redirection toward goals (hope) to succeed; and (d) perseverance and bouncing back in the face of problems and adversity and even beyond (resilience) to succeed" (F. Luthans et al. 2007), p. 12. In (Scheier and Carver 1985), dispositional optimism is described as the extent to which a person has positive expectations about his or her future. The construct of psychological capital is linked to other central themes in organizational psychology. The ability to cope with difficulties and overcome adverse events is also characteristic of concepts such as mental toughness, a strategy that, according to (Clough and Strycharczyk 2015), is useful for improving performance, resilience, and well-being in organizations. Like the definition of resilience, mental toughness concerns the behavioral aspect and is closely related to elements such as leadership, employability, and motivation. Founded like psychological capital on the theoretical framework of positive psychology, mental toughness therefore considers the existence of four fundamental dimensions, namely, control over everyday circumstances, commitment to bring about positive effects from one's actions, the challenge to overcome one's limits, and confidence in one's own abilities and skills.

Students who perceive positive expectations in the pursuit of their goals are more likely to persevere in the face of difficulty and find more ways to achieve their goals should obstacles arise. Self-efficacy, on the other hand, is based on the belief that it is possible to use known individual resources to achieve desired outcomes. This belief can be gained from a wealth of experience, self-study, positive feedback, and psychological reinforcement. Efficacy beliefs are highly predictive of goal setting and academic success (Bandura 1997). In summary, such personal adaptive coping resources appear to increase academic vitality, engagement, and receptivity, i.e., the three main dimensions of academic engagement, and consequently positively influence students' academic success and achievement (Sabbaghi et al. 2020). Thus, in view of the referenced literature, this study is aimed at exploring:

➢ The positive association between self-efficacy and academic engagement, as well as the one between optimism and academic engagement.

2.2. Academic Engagement and Technostress

As said before, the pandemic led to an exponential risk of stress due to the use of technology in academic settings, as the use of technology has increased exponentially. The results of a study of college students aged 18 to 28 years show that technostress negatively affects academic productivity, and these results are consistent with previous studies conducted in an organizational setting (Tarafdar et al. 2011; Chen 2015). University contexts, therefore, especially in recent periods, are undergoing major changes that increasingly raise their complexity (Brondino et al. 2022), thus consequently affecting the physical and psychological health (Urbina-Garcia 2020) of the entire community. In view of this complexity of overall academic variables, as suggested by (Datu and King 2018), academic engagement,

which describes the behavior of investment and commitment in the learning process of students (Martínez et al. 2019; Perkmann et al. 2021), can be broadly considered either a positive resource compared to outcomes such as well-being, a well-being consequence, or a related variable. Engagement is a positive state characterized by vigor, dedication, and receptivity. Vigor represents a high level of energy and mental agility expressed in a willingness to exert effort and persevere in the face of difficulty. Dedication means that one is intensely engaged in one's work, experiencing enthusiasm, inspiration, pride, challenge, and a sense of purpose. Absorption means being immersed in one's work and deepening it in a pleasurable way (Martínez et al. 2019; Schaufeli et al. 2002). Involvement has been widely studied in the work context, and there is strong empirical evidence of its relationship to job performance, profitability, and other important work outcomes (Harter et al. 2002). Due to its highly functional nature, engagement has also been extended to the academic context and conceptualized in terms of student tasks and activities. Several studies highlighted the central role of academic involvement in predicting performance-related aspects in university students. Therefore, focusing on what academic involvement can foster and what it can be useful for becomes a focal strategy for higher education. For example, (Martínez et al. 2019)'s study revealed the importance of this construct in European countries such as Spain and Portugal, as it correlated (positively) with academic performance. Similarly, (Carmona-Halty et al. 2021)'s study also reveals a positive link between academic engagement and performance, showing how, according to the JD-R model, fostering academic engagement through a correct balance between demands and resources can have an influence on academic performance. Thus, engagement, aside from being a positive motivational/affective state, is a predictor of positive outcomes and even an important driver in the mitigation of negative ones, such as stress. In this regard, a recent study during the COVID-19 pandemic period (J. Wang et al. 2021) deemed academic engagement to be a mediator between psychological capital and burnout, highlighting how the latter acted as a protective factor against negative outcomes. Involved students feel stimulated, strongly identify with their studies, and are highly involved in their academic lives. Therefore, previous research demonstrates that students who approach their studies with engagement are likely to be more successful. They use their resources effectively to meet the challenges and demands of their studies. They may feel stressed or exhausted, but these negative aspects are less likely to affect their performance.

Although the current literature does not extensively consider engagement to be a preventive factor against technostress, the few applications in this area are all focused on the workplace (Tarabay 2022). However, since engagement is a powerful vehicle for the development of work motivation according to the JD-R model, and since motivational processes are protective factors against health impairment processes (J. Wang et al. 2021; Carmona-Halty et al. 2021), based on the above literature, the aim of the study is to find out if:

— In the academic context, the process of engagement could involve (and then have) a negative and significant influence on technostress.

2.3. Coping Strategies to Manage Technostress

The growth of e-learning technologies changed the boundaries between traditional and distance education (Molino et al. 2020). Some educators see the massive proliferation of online courses as a positive force for expanding educational opportunities, while others view this trend as a threat to current models of higher education (Kulička et al. 2022). Consistent with the Job Demands–Resources (JD-R) model, psychological resources can help balance the demands and challenges of academic life, or at least enable students to cope with them in a more manageable way, which can promote their engagement and thus their performance. In addition, the positive dimensions of psychological capital such as efficacy, hope, optimism, and resilience may also trigger active and deliberate engagement in setting academic goals and pursuing them with vigor, dedication, and absorption, which may increase the likelihood of high academic achievement. Several studies have addressed

this issue (Martínez et al. 2019; B. C. Luthans et al. 2012; Roche et al. 2014; Salanova et al. 2010; Zajacova et al. 2005). Psychological factors such as academic engagement and personal resources are important predictors of academic achievement. Students' attitudes toward educational pathways, such as optimism (Sabbaghi et al. 2020), are also important factors in learning and improving academic performance (Ladd and Dinella 2009). Useful strategies and tools to limit the negative effects of processes harmful to health, such as technostress, are personal resources. In this sense, studies by (Honicke and Broadbent 2016) and (Affuso et al. 2022) have shown how certain attitudes and psychological constructs, such as feelings of self-efficacy and personal dispositions (optimism) (Rand et al. 2020), help students to better cope with the academic journey, which has significant positive effects on performance.

2.4. Aims and Hypotheses

Based on the theoretical model just established and depending on the rationales used for the presumed causal relationships, several research hypotheses were formulated and defined as follows:

H$_1$: *Self-efficacy, or the perception of control over one's future actions (Bandura 1997), is significant and negatively related to technostress.*

H$_2$: *Optimism, or the extent to which a person has significant positive expectations about the future (Medlin and Faulk 2011), is negatively related to technostress.*

H$_3$: *Self-efficacy and optimism are positively and significantly related to academic engagement.*

H$_4$: *Academic engagement, or the positive students' propensity toward learning, understanding, and mastering knowledge and skills (Rovan et al. n.d.), is negatively and significantly related to technostress.*

The hypotheses are shown in Figure 1.
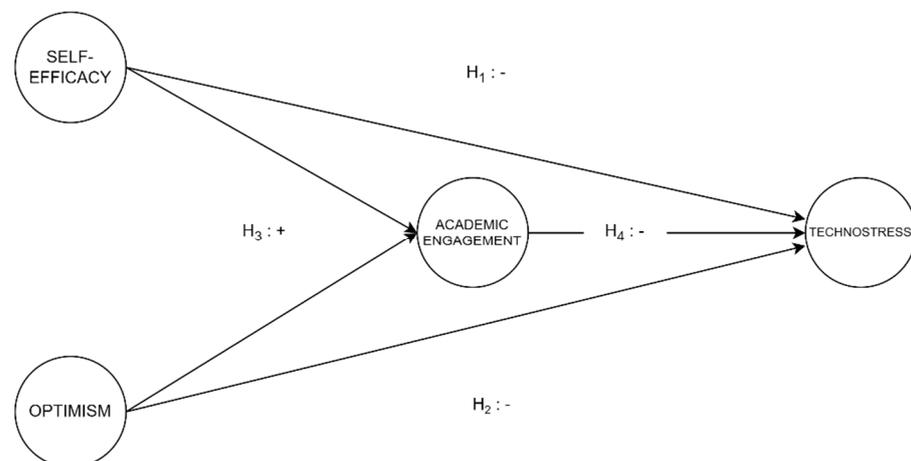
Figure 1. Theoretical Model to be Tested.

3. Materials and Methods

This study was performed on a sample of 421 Italian students who completed a self-report questionnaire during the height of the COVID-19 pandemic between May and November 2021 (during which they took online courses). Because this was an exploratory study, a cross-sectional research approach was used. A non-probabilistic snowballing procedure was used for the sample of students, as there were no inclusion or exclusion criteria. In the form sent to fill out the questionnaire, there were several questions, including one about the college of origin. For this reason, the universities to which the intercepted students belonged were multiple. The answer form was also set up so that students could only answer the test once. The answer form was also set up so that students could only

answer the test once and used a domain that belonged exclusively to their home college. Finally, to publicize the questionnaire, students received an email describing the project, were informed in course lectures, and received advertisements on social media and college pages. Once the link with the questionnaire was posted and students received it, they were asked to pass the survey on to other students until the final number of respondents was reached. Subjects were informed in advance of the purpose and methods of the study, and both anonymity and the ability to withdraw from the study at any time were assured and respected. All procedures were approved by the Ethics Committee of the University of Turin (protocol code no. 266199, date: 30 April 2021) and complied with the guidelines of the Declaration of Helsinki.

3.1. Data Analysis

The procedure for data analysis was developed in the following steps:

1. Analysis of the validity of the measured values with appropriate reliability indices (Cronbach's alpha and McDonald's omega (Gliem and Gliem 2003).
2. Elaboration of the SEM model by considering four latent variables, or self-efficacy (4 manifest indicators), optimism (5 manifest indicators), academic engagement (4 manifest indicators), and technostress (5 manifest indicators), with a relative correlation matrix. The relationships between the variables were tested again using mediation models, with academic engagement considered as a mediation variable.

The analyses were performed using MPlus software, version 7 and Jamovi, Version 1.8.0.1, with the SEM module.

3.2. Sample Description

Regarding descriptive variables, 64.4% of study participants (271) were female, 34.4% (145) were male, 1% were non-binary (4), and 0.2% were transitioning (1). The average age of participants was 24.6 years, ranging from 18 to 62 years, with a SD of 6.9. The status of student respondents was predominantly full-time (87.6%, 369 individuals), while 12.4% (52 individuals) were part-time students. Most students were enrolled in a three-year degree program (67.6%, 278 people). There were 28.0% (115 people) enrolled in a master's degree program and 4.4% (18 students) enrolled in a one-year program. In addition, 82.3% of students reported that they were on schedule with their studies (334), while 17.7% were not on schedule (72). To also explore the academic situation of the study participants, the students responded that they were ahead or on par with what they needed to complete in exams 46.6% of the time, while they were behind 53.4% of the time.

3.3. Measures

Measures representing manifest indicators of the latent variables of the model were identified and collected using appropriate validated scales. Specifically:

- Academic self-efficacy (ad hoc questionnaire), through 4 items, measured with Likert scale from 1 = Never to 5 = Always. An example of an item is: "Can you effectively balance your workload in view of other commitments?" with Cronbach's alpha = 0.76 and McDonald's omega = 0.71.
- Optimism (Scheier and Carver 1985), via 5 items measured with Likert scale from 1 = Totally disagree to 5 = Completely agree. An example of an item is: "*In times of uncertainty, I usually expect the best*" with Cronbach's alpha = 0.81, McDonald's omega = 0.78. The initial validation of the scale and of the optimism (factorial, internal consistency, test-retest reliability, convergent and discriminant validation) subdimension was assessed in (Scheier and Carver 1985).
- Academic engagement (Rovan et al. n.d.), via 4 items measured with Likert scale from 1 = Strongly disagree to 5 = Strongly agree. An example of an item is: "*When I am in a remote class, I do my best*" with Cronbach's alpha = 0.77 and McDonald's omega = 0.79. The initial validation of the scale (factorial, internal consistency, test-retest reliability, convergent and discriminant validation) was assessed in (Rovan et al.

n.d.). Academic engagement is a construct characterized by three dimensions, namely behavioral, cognitive and emotional. In this study, the items adopted were taken from the behavioral dimension.

- Technostress (Tarafdar et al. 2011; Molino et al. 2020), via 5 items measured with Likert scale from 1 = Never to 5 = Always. An example of an item is: "*Is your academic productivity negatively influenced by the Internet?*" with Cronbach's alpha = 0.76 and McDonald's omega = 0.71. The initial validation of the scale (factorial, internal consistency, test-retest reliability, convergent and discriminant validation) was assessed in (Fioravanti and Casale 2015).

Thus, the reliability of all the used variables was confirmed through appropriate indices.

4. Results

Table 1 shows the main descriptive statistics of the sample. To obtain these indices, the average of the scores per observation in each construct of interest was calculated. The correlation matrix calculated using the values of the latent variables of the constructs showed positive and significant associations between academic engagement and self-efficacy ($r = 0.382$, $p < 0.001$), as well as between optimism and self-efficacy ($r = 0.381$, $p < 0.001$). In contrast, however, technostress and academic engagement were negatively correlated ($r = -0.454$, $p < 0.001$), as were self-efficacy and technostress ($r = -0.422$, $p < 0.001$) and optimism and technostress ($r = -0.264$, $p < 0.001$). Finally, optimism and academic engagement were positively related ($r = 0.127$, $p < 0.05$). On initial analysis, therefore, personal resources are negatively associated with inauspicious outcomes, such as technostress, as well as academic engagement, which is shown to be a protective factor (Table 2).

Table 1. Descriptive analysis of the sample.

	Mean	SD	Skewness	Kurtosis
Self-efficacy	3.23	0.93	−0.10	−0.60
Optimism	2.90	0.93	0.04	−0.41
Academic engagement	3.46	0.85	−0.30	−0.32
Technostress	2.35	0.90	0.50	−0.26

Table 2. Correlation analyses between variables in the model.

	1	2	3	4
1. Self-efficacy	-			
2. Optimism	0.381 ***	-		
3. Academic engagement	0.382 ***	0.127	-	
4. Technostress	−0.422 ***	−0.264 ***	−0.454 ***	-

Note: ***: significant at <0.001 level.

The SEM model highlighted good fit indices (Kline 2016), with CFI = 0.949, TLI = 0.938, SRMR = 0.052, RMSEA = 0.050, 90% CI (RMSEA) = [0.041; 0.059]. The measurement model also revealed that all item loadings on latent constructs were significant. In particular, for self-efficacy, the range of standardized loadings is [0.64; 0.85], for optimism [0.41; 0.89], for academic engagement [0.40; 0.87], and for technostress [0.42; 0.77].

The hypothesized multiple mediation model aims to assess whether and how the personal resources included in this study, which generally constitute the psychological construct of psychological capital, are efficient predictors in the relationship linking them to students' technostress and how, in this relationship, academic engagement acts as a mediator. The results of the analyses, as shown in Figure 2, show that both self-efficacy ($\beta_{SE \to TECHNO} = -0.26$, $p < 0.001$) and optimism ($\beta_{OPT \to TECHNO} = -0.13$, $p < 0.05$) have direct effects on technostress, particularly negative ones, thus representing protective factors. Self-efficacy and optimism thus represent two powerful strategies that characterize

positive personal resources that can activate motivational processes, as assumed in the JD-R model, further confirming the hypotheses of the study, H_1 and H_2.
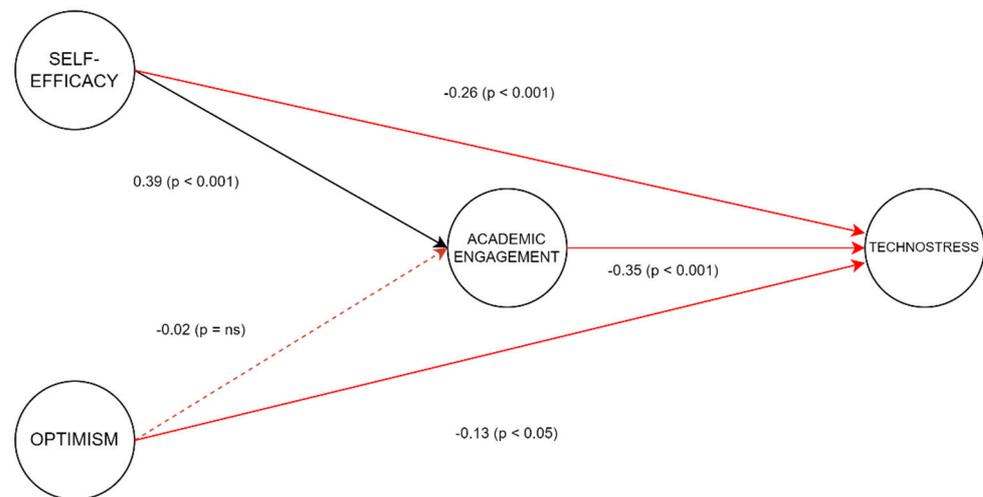
Figure 2. The final model with coefficients.

Self-efficacy, in turn, increases academic engagement significantly ($\beta_{SE \to AC.ENG} = 0.39$, $p < 0.001$), while optimism has no effect ($\beta_{OPT \to AC. ENG} = -0.02$, $p = 0.744$). In this case, therefore, only part of Hypothesis 3 is confirmed by the empirical data. Finally, academic engagement appears to reduce the impact of technostress on the lives of students involved in the study ($\beta_{AC. ENG \to TECHNO} = -0.35$, $p < 0.001$), thereby corroborating hypothesis H_4. Regarding the deepening of indirect effects, this study shows that the effect of self-efficacy, which also has a direct effect on technostress, is mediated partially and significantly (about 35%) by the inclusion of academic engagement in the relationship ($\beta_{SE \to AC. ENG \to TECHNO} = -0.14$, $p < 0.001$), while the latter appears to be not significant when it starts with optimism. Therefore, acting on personal resources such as self-efficacy could have a double effect in terms of academic performance: either by intervening directly in the relationship, with a reductive effect, or by reinforcing capacities that are shown to be important of curbing negative processes that impact students' well-being, such as technostress in particular. All the described relationships were validated through bootstrapping = 5000, with all confidence intervals being significant.

In proposing the model hypothesized in the study, we tested the explained variance of each latent variable against its antecedents. As shown in Table 3, technostress was considered both as a mediator and outcome in the proposed mediation model. In this regard, starting from the assumption that the fit indices are the same, as the model is identical but with a shift in variables, the explained variance of the endogenous variables was analyzed. Therefore, technostress explains its antecedents more when it is structured as an outcome rather than as a mediator, supporting the hypothesis of the model studied.

Table 3. Alternative model explained variance for outcome variables.

Model	Mediator Variable	Outcome Variable	R^2 Endogenous Outcome Variable
Model 1	Academic engagement	Technostress	31%
Model 2	Technostress	Academic engagement	26%

More specifically, it is apparent that technostress as an outcome variable allows for an explained variance of 31% with respect to the latent antecedents, as opposed to academic engagement, which, as an outcome, accounts for 26%.

The difference in explained variance is thus 5%, which means that more information can be captured in the model when technostress is an outcome rather than a mediator. Therefore, for this reason and by virtue of the theoretical rationale described above, the model with technostress as the outcome variable was chosen as most appropriate.

5. Discussion

The results of this study highlight important elements to consider for pedagogical practice in higher education. Specifically, this study, which places itself within a positive psychology perspective (Williams et al. 2018) and uses Bakker and Demerouti's Job Demands–Resources as a reference model (Bakker and Demerouti 2017), notes that implementing positive resources is essential for developing effective practices to appropriately mitigate the effects of technostress. As (Williams et al. 2018) also notes, the strengths-based approach to positive psychology training is becoming increasingly important in the study of the dynamics of higher education. Namely, focusing on this perspective allows the individual or the individual student to focus on their personal strengths. The positive psychology approach allows for the identification of a useful perspective for improving the well-being and success of students, including higher education students.

Specifically, this study, conducted on 421 students, shows that personal resources such as self-efficacy and optimism are important, both in a direct sense in terms of technostress and in an indirect sense through the impact on academic engagement. The effect of self-efficacy on technostress has already been studied in other domains, such as IT (Shu et al. 2011) and more recently concerning work, especially during the height of the pandemic period, as a moderator by (Yener et al. 2020), who identified it as one of the factors that can mitigate the effects of stress caused by new technologies, and by (Saleem et al. 2021). From this point of view, the result obtained is consolidated in the literature on the subject, although there is still little evidence of this relationship, even in training and higher education.

The relationship between optimism (as a dispositional factor) and technostress also appears to have been extensively studied in the literature, although it remains poorly understood. For example, the study by (Yap and Kew 2021) found that optimism did not mitigate the effects of technostress among college teachers in Malaysia. In contrast, the study of (Raza et al. 2022) showed that optimism is a contributory factor to the negative effects of stress caused by new technologies. In the same vein, the study of (Wijayanti and Riza 2021) demonstrated that the elements that characterize the construct of psychological capital (self-efficacy, optimism, resilience, and hope) can activate behaviors that contribute to reducing the effects of technostress. Again, due in part to the exceptional situation caused by the pandemic, there appear to be few studies of students, so the in-depth study conducted as part of the survey shows that optimism can be considered a personal resource and protective factor.

Regarding indirect effects, this study focused on the dynamics between self-efficacy and optimism and academic engagement on the one hand, and between academic engagement and technostress on the other. Regarding the first relationship investigated, in line with the indications of other studies in this area, the results of this study allow us to verify the extent to which self-efficacy, i.e., a positive resource according to the JD-R model, increases student engagement. In this regard, other studies, such as those by (Lavasani et al. 2009) and (Samavi et al. 2017), agree that self-efficacy is indeed positively associated with increased academic engagement. As for the relationship between optimism and academic engagement, building on the study of (Nurttila et al. 2015), which found a significant relationship between optimistic disposition and academic engagement only in one group of students (called "optimists"), the results of this study show that optimism seems to have no effect on academic engagement and thus does not represent the role of fostering and activating mechanisms of enthusiasm for the educational path. This result, apparently inconsistent with other past studies (Sabbaghi et al. 2020; Anierobi and Unachukwu 2020) in which optimism seems to be positively associated with academic engagement instead,

could be interpreted with the exact time period in which the study was conducted, i.e., during a prolonged period of health distress, in which optimistic disposition could be lower than during periods of normality, also due to the different ways in which knowledge is transmitted (Mean $_{OPTIMISM}$ = 2.90, see Table 1).

This would be consistent with studies suggesting that engagement is associated with the desire to contribute to an organization with energy and passion (Wu et al. 2022; Tarabay 2022). Given the need to participate in the academic environment and the imposition of physical disengagement and required social distancing, it is plausible that the relationship between optimism and engagement changed during this period. Moreover, this finding could be related to a possible optimistic tendency during the pandemic period that led people to lower engagement in protective activities (Fragkaki et al. 2021). This behavioral tendency may have extended to other areas of life and created a kind of psychological homogeneity in coping with the pandemic emergency.

Finally, the relationship between academic engagement and technostress seems to be consistent with hypotheses in the literature. Although, as mentioned earlier, this relationship has not been extensively studied in academia, engagement is one of the motivational processes that, according to the JD-R model, is promoted by resources and inhibited by work demands. The relationship between the outcomes of motivational processes and the outcomes related to health impairment processes (e.g., technostress) is known to be negative, as found in several studies (Wu et al. 2022; Tarabay 2022). Therefore, engagement serves as a positive and indirect resource that can curb the effects of technostress in students as well.

6. Conclusions

This study generally aimed to extend the validity of the theoretical model of work demands and resources to the academic field, focusing on the relationships and possible causes of the implementation of performance and, indirectly, well-being. Based on the results obtained, especially in relation to students as recipients, the model used proves to be highly suitable to explain the polarity and intensity of the relationships studied.

In particular, self-efficacy and optimistic attitudes toward the academic future prove to be supportive and protective tools with respect to the effect and consequences of a process that has been much studied and researched, especially in the post-pandemic period, namely technostress, or stress caused by the use of new technologies. Self-efficacy, in turn, enables the implementation of motivational processes such as academic engagement, while optimism, which is probably a "natural" disposition that is certainly influenced by the changes in the educational process, does not have the same effect. Finally, academic engagement is also a protective tool against technostress.

In terms of practical implications, this study provides many important clues and insights for improving academic performance and well-being. Leveraging personal resources can have important implications for preventing negative outcomes, using a tool, telematics, that has become more common and widely used since the pandemic. Universities can play a leading role in fostering the development of human capital, as the literature on soft skills also indicates that various opportunities can be envisioned at universities to support the recognition and expression of these resources (Emanuel et al. 2021; Ghislieri et al. 2023). A first option is to include soft skills in academic curricula (Virtanen and Tynjälä 2019; Zhang 2012), through a preparatory training of college lecturers so that they not only propose teaching methods useful for the formation of soft skills (group work, flipped teaching, individual and collective presentations, etc.), but also know how to give indications and feedback related to these dimensions, knowing how to create opportunities for experimentation and learning, in addition to the traditional and necessary more rigorous moments of assessment. This type of approach reduces the problems of lack of learning transfer associated with soft skill workshops (Laker and Powell 2011). However, this teaching approach is not easily disseminated and also requires certain contextual conditions (classrooms with a small number of students, an appropriate attitude of the lecturer, etc.), so

that special workshops can also contribute to the development of soft skills. Universities are offering more and more courses of this type, both to support academic success and to accompany encounters with the world of work. The content of these special courses can range from soft skills to life skills to career management skills (Emanuel et al. 2021): in any case, these are always opportunities to work on transversal dimensions that promote autonomy and well-being in facing challenges and transitions. The methods used can also vary and include the use of self-assessment tools through platforms, structured exercises, role plays, readings, theatrical exercises, and the use of film clips.

In some cases, with the main objective of promoting and raising awareness of soft skills, universities offer computer-based tools to reach large numbers of students (Emanuel et al. 2021): the effectiveness of these courses in improving the self-assessment of one's soft skills has been partially demonstrated, although studies of the medium- and long-term effects, which include forms of peer assessment or the use of objective indicators of success (academic or career outcomes) in addition to subjective perceptions of well-being, are lacking.

Our results also suggest that only self-efficacy has strategic importance, suggesting that a skill that can be developed and improved over time plays a more important role than a dispositional tendency such as optimism. Thus, this study contributes to a post-pandemic rethinking of the organizational structures and assumptions that shape higher education research and strongly supports the role of personal resource development in academia. This is important following the pandemic emergency, which was emotionally challenging, particularly for young students, including in terms of their recognition of self-efficacy, which was negatively impacted during the height of the COVID-19 pandemic (Talsma et al. 2021).

From a neuropsychological perspective, younger individuals are more likely to experience negative emotions because they are less able to control them, while more mature brains are equipped with a complex and more sophisticated emotional thermostat. According to (Reuter-Lorenz and Lustig 2005), more mature brains are more susceptible to a combination of functional reorganization and compensatory strategies that cause them to have more positive emotional responses than younger ones. For this reason, soft skills would help young people cope with negative events on the one hand and develop strong psychological capital to cope with daily challenges on the other. In this regard, they would be particularly aware of the importance of soft skills in general, as they help with both interpersonal and relationship skills and are considered to boost people's professional skills and development (Russo 2015).

In this post-pandemic restructuring situation, interventions should first focus on raising awareness of soft skills and offer strategies for problem-solving skills. This would provide the opportunity to work on resilience and self-efficacy to avoid losing engagement, as studies in the literature indicate that self-efficacy is associated with academic achievement. Finally, a concluding observation: working on personal resources and thus increasing engagement is functional in reducing dropout rates. In fact, engaged students are less likely to drop out or think about leaving college (Medlin and Faulk 2011). This would set in motion a positive spiral: students would be more aware and capable of their soft skills, would be more engaged, and the likelihood of dropping out would likely decrease.

7. Limitations

Although this study is original, it has limitations that must be considered when generalizing the results. In particular, the variables were collected subjectively, i.e., using self-reporting, which leaves open the question of social desirability. Future studies could use more objective measures of academic performance, such as average exam grade or number of failed exams. Although the sample is college students, the number and inherent characteristics (non-probabilistic sampling) do not allow for broad generalization. Further studies could test the robustness of the results in larger and more heterogeneous samples. Furthermore, no differentiating variables were provided. In fact, the results could differ

according to the field of study, since some more practical disciplines (requiring laboratory instruction, for example) could be more affected by the telematics method, and results could vary according to the educational level of the students (graduate or undergraduate). Finally, the use of certain scales to measure certain constructs could also prove to be a limitation: for example, the construct of academic engagement, which was studied in a multidimensional manner, was focused on a purely behavioral dimension in this study. Further studies could integrate other dimensions to confirm the results.

Author Contributions: Conceptualization, E.I., M.Z. and C.G.; Methodology, E.I., E.C., F.S., M.Z. and C.G.; Software, E.C., F.S. and M.Z.; Validation, E.I., F.S., M.Z. and V.R.; Formal analysis, E.C., F.S., M.Z. and C.G.; Investigation, E.I., M.Z., V.R. and C.G.; Resources, E.I. and C.G.; Data curation, E.C., F.S., M.Z. and C.G.; Writing—original draft, E.I., F.S., M.Z., V.R. and C.G.; Writing—review & editing, E.I., F.S., M.Z., V.R. and C.G.; Visualization, E.I.; Supervision, E.I., M.Z. and C.G.; Project administration, E.I. and C.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of University of Turin (protocol code no. 266199, date: 30 April 2021)." for studies involving humans.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding authors. The data are not publicly available due to privacy reasons.

Conflicts of Interest: The authors declare no conflict of interest.

References

Affuso, Gaetana, Anna Zannone, Concetta Esposito, Maddalena Pannone, Maria Concetta Miranda, Grazia De Angelis, Serena Aquilar, Mirella Dragone, and Dario Bacchini. 2022. The Effects of Teacher Support, Parental Monitoring, Motivation and Self-Efficacy on Academic Performance over Time. *European Journal of Psychology of Education* 38: 1–23. [CrossRef]

Anierobi, Elizabeth Ifeoma, and Gabriel Chidi Unachukwu. 2020. Achievement Motivation and Academic Optimism as Correlates of Academic Engagement among Postgraduate Students in Nnamdi Azikiwe Unversity (Nau), Awka. *Social Sciences and Education Research Review* 1: 242–63.

Bailey, Thomas Hamilton, and Lisa J. Phillips. 2016. The Influence of Motivation and Adaptation on Students' Subjective Well-Being, Meaning in Life and Academic Performance. *Higher Education Research & Development* 35: 201–16. [CrossRef]

Bakker, Arnold B., and Evangelia Demerouti. 2014. Job Demands–Resources Theory. In *Work and Wellbeing: A complete Reference Guide*. Edited by P. Y. Chen and C. L. Cooper. New York: John Wiley & Sons, pp. 1–28.

Bakker, Arnold B., and Evangelia Demerouti. 2017. Job Demands–Resources Theory: Taking Stock and Looking Forward. *Journal of Occupational Health Psychology* 22: 273. [CrossRef]

Bakker, Arnold B., and Juriena D. de Vries. 2021. Job Demands–Resources theory and self-regulation: New explanations and remedies for job burnout. *Anxiety, Stress, & Coping* 34: 1–21.

Bandura, Albert. 1997. Self-Efficacy: The Exercise of Control. *Self-Efficacy: The Exercise of Control* ix: 158–66. [CrossRef]

Brondino, Margherita, Fulvio Signore, Agnese Zambelli, Emanuela Ingusci, Silvia Pignata, Amelia Manuti, and Maria Luisa Giancaspro. 2022. A New Academic Quality at Work Tool (AQ@workT) to Assess the Quality of Life at Work in the Italian Academic Context. *International Journal of Environmental Research and Public Health* 19: 3724. [CrossRef]

Carmona-Halty, Marcos, Marisa Salanova, Susana Llorens, and Wilmar B. Schaufeli. 2021. Linking Positive Emotions and Academic Performance: The Mediated Role of Academic Psychological Capital and Academic Engagement. *Current Psychology* 40: 2938–47. [CrossRef]

Chen, Lei-da. 2015. Validating the Technostress Instrument Using a Sample of Chinese Knowledge Workers. *Journal of International Technology and Information Management* 24: 5. [CrossRef]

Cheon, Sung Hyeon, Johnmarshall Reeve, and Maarten Vansteenkiste. 2020. When Teachers Learn How to Provide Classroom Structure in an Autonomy-Supportive Way: Benefits to Teachers and Their Students. *Teaching and Teacher Education* 90: 103004. [CrossRef]

Clough, Peter, and Doug Strycharczyk. 2015. *Developing Mental Toughness: Coaching Strategies to Improve Performance, Resilience and Wellbeing*, 2nd ed. London and Philadellphia: Kogan Page.

Cortese, Anthony D. 2003. The Critical Role of Higher Education in Creating a Sustainable Future. *Planning for Higher Education* 31: 15–22.

Danilowicz-Gösele, Kamila, Katharina Lerche, Johannes Meya, and Robert Schwager. 2017. Determinants of Students' Success at University. *Education Economics* 25: 513–32. [CrossRef]

Datu, Jesus Alfonso D., and Ronnel B. King. 2018. Subjective Well-Being Is Reciprocally Associated with Academic Engagement: A Two-Wave Longitudinal Study. *Journal of School Psychology* 69: 100–10. [CrossRef]

Demerouti, Evangelia, Arnold B. Bakker, Friedhelm Nachreiner, and Wilmar B. Schaufeli. 2001. The Job Demands-Resources Model of Burnout. *Journal of Applied Psychology* 86: 499. [CrossRef] [PubMed]

Di Fabio, Annamaria. 2017. Positive Healthy Organizations: Promoting well-being, meaningfulness, and sustainability in organizations. *Frontiers in Psychology* 8: 1938. [CrossRef] [PubMed]

Dooris, Mark, Alan Farrier, Sharon Doherty, Maxine Holt, Robert Monk, and Susan Powell. 2016. The UK Healthy Universities Self-Review Tool: Whole System Impact. *Health Promotion International* 33: 448–57. [CrossRef]

Dooris, Mark, and Sharon Doherty. 2010. Healthy Universities—Time for Action: A Qualitative Research Study Exploring the Potential for a National Programme. *Health Promotion International* 25: 94–106. [CrossRef] [PubMed]

Emanuel, Federica, Paola Ricchiardi, Domenico Sanseverino, and Chiara Ghislieri. 2021. Make Soft Skills Stronger? An Online Enhancement Platform for Higher Education. *International Journal of Educational Research Open* 2: 100096. [CrossRef]

Fioravanti, Giulia, and Silvia Casale. 2015. Evaluation of the Psychometric Properties of the Italian Internet Addiction Test. *Cyberpsychology, Behavior, and Social Networking* 18: 120–28. [CrossRef]

Fragkaki, Iro, Dominique F. Maciejewski, Esther L. Weijman, Jonas Feltes, and Maaike Cima. 2021. Human Responses to COVID-19: The Role of Optimism Bias, Perceived Severity, and Anxiety. *Personality and Individual Differences* 176: 110781. [CrossRef]

Gallè, Francesca, Elita Anna Sabella, Giovanna Da Molin, Osvalda De Giglio, Giuseppina Caggiano, Valeria Di Onofrio, Stefano Ferracuti, Maria Teresa Montagna, Giorgio Liguori, Giovanni Battista Orsi, and et al. 2020. Understanding Knowledge and Behaviors Related to CoViD–19 Epidemic in Italian Undergraduate Students: The EPICO Study. *International Journal of Environmental Research and Public Health* 17: 3481. [CrossRef] [PubMed]

Ghislieri, Chiara, Domenico Sanseverino, Valentina Dolce, Paola Spagnoli, Amelia Manuti, Emanuela Ingusci, and Tindara Addabbo. 2023. Emotional Exhaustion and Engagement in Higher Education Students during a Crisis, Lessons Learned from COVID-19 Experience in Italian Universities. *Social Sciences* 12: 109. [CrossRef]

Gliem, Joseph A., and Rosemary R. Gliem. 2003. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Paper presented at Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, DeKalb, IL, USA, October 9–11.

Guppy, Neil, Uwe Matzat, Jenilyn Agapito, Audon Archibald, Amy De Jaeger, Tania Heap, Ma Monica Moreno, Maria Mercedes Rodrigo, and Silvia Bartolic. 2022. Student Confidence in Learning during the COVID-19 Pandemic: What Helped and What Hindered? *Higher Education Research & Development* 42: 845–59. [CrossRef]

Harter, James K., Frank L. Schmidt, and Theodore L. Hayes. 2002. Business-Unit-Level Relationship between Employee Satisfaction, Employee Engagement, and Business Outcomes: A Meta-Analysis. *Journal of Applied Psychology* 87: 268. [CrossRef]

Holt, Maxine, and Susan Powell. 2017. Healthy Universities: A Guiding Framework for Universities to Examine the Distinctive Health Needs of Its Own Student Population. *Perspectives in Public Health* 137: 53–58. [CrossRef]

Honicke, Toni, and Jaclyn Broadbent. 2016. The Influence of Academic Self-Efficacy on Academic Performance: A Systematic Review. *Educational Research Review* 17: 63–84. [CrossRef]

Ingusci, Emanuela, Fulvio Signore, Paola Pasca, Alessia Catalano, Silvia De Masi, Giovanni Mattia Gioia, Amelia Manuti, Monica Molino, Paola Spagnoli, and Claudio Giovanni Cortese. 2020. Boosting Human and Social Capital in the University: The Role of Seeking Challenges on Academic Performance. *BPA Applied Psychology Bulletin* 68: 30–42. [CrossRef]

Kline, Rex B. 2016. *Principles and Practice of Structural Equation Modeling*, 4th ed. Methodology in the Social Sciences. New York: The Guilford Press.

Knight, Anneyce, and Vincent La Placa. 2013. Healthy Universities: Taking the University of Greenwich Healthy Universities Initiative Forward. *International Journal of Health Promotion and Education* 51: 41–49. [CrossRef]

Kulička, Jiří, Vladimír Jehlička, and Ondřej Slavíček. 2022. The Influence of Educational Technologies and Students' Academic Disposition on Their Study Success in the First Year at University. *International Journal of Information and Education Technology* 12: 507–17. [CrossRef]

Ladd, Gary W., and Lisa M. Dinella. 2009. Continuity and Change in Early School Engagement: Predictive of Children's Achievement Trajectories from First to Eighth Grade? *Journal of Educational Psychology* 101: 190. [CrossRef] [PubMed]

Laker, Dennis R., and Jimmy L. Powell. 2011. The Differences between Hard and Soft Skills and Their Relative Impact on Training Transfer. *Human Resource Development Quarterly* 22: 111–22. [CrossRef]

Lavasani, Masoud Golamali, Javad Ejei, and Mohsen Afshari. 2009. The Relationship between Academic Self Efficacy and Academic Engagement with Academic Achievement. *Journal of Psychology* 13: 289–305.

Luthans, Brett Carl, Kyle William Luthans, and Susan M. Jensen. 2012. The Impact of Business School Students' Psychological Capital on Academic Performance. *Journal of Education for Business* 87: 253–59. [CrossRef]

Luthans, Fred, Carolyn M. Youssef, and Bruce J. Avolio. 2007. Psychological Capital: Investing and Developing Positive Organizational Behavior. *Positive Organizational Behavior* 1: 9–24.

Maqsood, Aneela, Jaffar Abbas, Ghazala Rehman, and Riaqa Mubeen. 2021. The Paradigm Shift for Educational System Continuance in the Advent of COVID-19 Pandemic: Mental Health Challenges and Reflections. *Current Research in Behavioral Sciences* 2: 100011. [CrossRef]

Martínez, Isabel M., Carolyn M. Youssef-Morgan, Maria J. Chambel, and Alexandra Marques-Pinto. 2019. Antecedents of Academic Performance of University Students: Academic Engagement and Psychological Capital Resources. *Educational Psychology* 39: 1047–67. [CrossRef]

Medlin, Bobby, and Larry Faulk. 2011. The Relationship between Optimism and Engagement: The Impact on Student Performance. *Research in Higher Education Journal* 13: 1–9.

Molino, Monica, Emanuela Ingusci, Fulvio Signore, Amelia Manuti, Maria Luisa Giancaspro, Vincenzo Russo, Margherita Zito, and Claudio G. Cortese. 2020. Wellbeing Costs of Technology Use during COVID-19 Remote Working: An Investigation Using the Italian Translation of the Technostress Creators Scale. *Sustainability* 12: 5911. [CrossRef]

Nurttila, Suvi, Elina Ketonen, and Kirsti Lonka. 2015. Sense of Competence and Optimism as Resources to Promote Academic Engagement. *Procedia-Social and Behavioral Sciences* 171: 1017–26. [CrossRef]

Perkmann, Markus, Rossella Salandra, Valentina Tartari, Maureen McKelvey, and Alan Hughes. 2021. Academic Engagement: A Review of the Literature 2011–2019. *Research Policy* 50: 104114. [CrossRef]

Qi, Cong. 2019. A Double-Edged Sword? Exploring the Impact of Students' Academic Usage of Mobile Devices on Technostress and Academic Performance. *Behaviour & Information Technology* 38: 1337–54.

Rand, Kevin L., Mackenzie L. Shanahan, Ian C. Fischer, and Sarah K. Fortney. 2020. Hope and Optimism as Predictors of Academic Performance and Subjective Well-Being in College Students. *Learning and Individual Differences* 81: 101906. [CrossRef]

Raza, Ali, Muhammad Ishtiaq Ishaq, Haleema Zia, Zia ur-Rehman, and Rehan Ahmad. 2022. Technostressors and Service Employees Outcomes: A Longitudinal Study. *The Service Industries Journal* 42: 1030–1053. [CrossRef]

Reuter-Lorenz, Patricia A., and Cindy Lustig. 2005. Brain Aging: Reorganizing Discoveries about the Aging Mind. *Current Opinion in Neurobiology* 15: 245–51. [CrossRef] [PubMed]

Roche, Maree, Jarrod M. Haar, and Fred Luthans. 2014. The Role of Mindfulness and Psychological Capital on the Well-Being of Leaders. *Journal of Occupational Health Psychology* 19: 476. [CrossRef]

Rovan, Daria, Tajana Ljub Golub, and Petričević Ema. n.d. Construction and Validation of Academic Engagement Scale. In *Construction and Validation of Academic Engagement Scale*. Unpublished Manuscript. Croatia: Department of Psychology, Faculty of Teacher Education, University of Zagreb.

Russo, Bustreo. 2015. *Self Marketing per Le Professioni. Un Percorso Formativo per i Talenti Dell'alta Formazione*, 1st ed. Milan: Franco Angeli.

Sabbaghi, Fariborz, Kiomars Karimi, Maryam Akbari, and Yahya Yarahmadi. 2020. Predicting Academic Engagement Based on Academic Optimism, Competency Perception and Academic Excitement in Students. *Iranian Journal of Educational Sociology* 3: 50–61. [CrossRef]

Sahu, Pradeep. 2020. Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. *Cureus* 12: e7541. [CrossRef]

Salanova, Marisa, Wilmar Schaufeli, Isabel Martínez, and Edgar Bresó. 2010. How Obstacles and Facilitators Predict Academic Performance: The Mediating Role of Study Burnout and Engagement. *Anxiety, Stress & Coping* 23: 53–70.

Saleem, Farida, Muhammad Imran Malik, Saiqa Saddiqa Qureshi, Muhammad Faisal Farid, and Sabeen Qamar. 2021. Technostress and Employee Performance Nexus During COVID-19: Training and Creative Self-Efficacy as Moderators. *Frontiers in Psychology* 12: 595119. [CrossRef]

Samavi, Seyed Abdolvahab, Kolsom Ebrahimi, and Mousa Javdan. 2017. Relationship between Academic Engagements, Self-Efficacy and Academic Motivation with Academic Achievement among High School Students in Bandar Abbas. *Biquarterly Journal of Cognitive Strategies in Learning* 4: 71–92.

Schaufeli, Wilmar B., Marisa Salanova, Vicente González-Romá, and Arnold B. Bakker. 2002. The Measurement of Engagement and Burnout: A Two Sample Confirmatory Factor Analytic Approach. *Journal of Happiness Studies* 3: 71–92. [CrossRef]

Scheier, Michael F., and Charles S. Carver. 1985. Optimism, Coping, and Health: Assessment and Implications of Generalized Outcome Expectancies. *Health Psychology* 4: 219. [CrossRef]

Shu, Qin, Qiang Tu, and Kanliang Wang. 2011. The Impact of Computer Self-Efficacy and Technology Dependence on Computer-Related Technostress: A Social Cognitive Theory Perspective. *International Journal of Human-Computer Interaction* 27: 923–39. [CrossRef]

Signore, Fulvio, Alessia Catalano, Elisa De Carlo, Andreina Madaro, and Emanuela Ingusci. 2019. The role of employability in students during academic experience: A preliminary study through PLS-PM technique. *Electronic Journal of Applied Statistical Analysis* 12: 720–47.

Talsma, Kate, Kayleigh Robertson, Cleo Thomas, and Kimberley Norris. 2021. COVID-19 Beliefs, Self-Efficacy and Academic Performance in First-Year University Students: Cohort Comparison and Mediation Analysis. *Frontiers in Psychology* 12: 643408. [CrossRef] [PubMed]

Tarabay, Khaldoun. 2022. The Impact of Technostress on Work Engagement. Ph.D. thesis, Lebanese American University, Beirut, Lebanon.

Tarafdar, Monideepa, Qiang Tu, T. S. Ragu-Nathan, and Bhanu S. Ragu-Nathan. 2011. Crossing to the Dark Side: Examining Creators, Outcomes, and Inhibitors of Technostress. *Communications of the ACM* 54: 113–20. [CrossRef]

Urbina-Garcia, Angel. 2020. What Do We Know about University Academics' Mental Health? A Systematic Literature Review. *Stress and Health* 36: 563–85. [CrossRef]

Virtanen, Anne, and Päivi Tynjälä. 2019. Factors Explaining the Learning of Generic Skills: A Study of University Students' Experiences. *Teaching in Higher Education* 24: 880–94. [CrossRef]

Vizoso, Carmen, Celestino Rodríguez, and Olga Arias-Gundín. 2018. Coping, Academic Engagement and Performance in University Students. *Higher Education Research & Development* 37: 1515–29.

Wang, Jinfang, Lingrui Bu, Yan Li, Jie Song, and Na Li. 2021. The Mediating Effect of Academic Engagement between Psychological Capital and Academic Burnout among Nursing Students during the COVID-19 Pandemic: A Cross-Sectional Study. *Nurse Education Today* 102: 104938. [CrossRef]

Wang, Xinghua, Seng Chee Tan, and Lu Li. 2020. Technostress in University Students' Technology-Enhanced Learning: An Investigation from Multidimensional Person-Environment Misfit. *Computers in Human Behavior* 105: 106208. [CrossRef]

Weber, Hannes, Dominik Becker, and Steffen Hillmert. 2019. Information-Seeking Behaviour and Academic Success in Higher Education: Which Search Strategies Matter for Grade Differences among University Students and How Does This Relevance Differ by Field of Study? *Higher Education* 77: 657–78. [CrossRef]

Wijayanti, Dwi Marlina, and Alex Fahrur Riza. 2021. The Role of Religious Orientation and PsyCap in Mitigating Technostress. *Journal of Management, Spirituality & Religion* 18: 358–74.

Williams, Noël, Leah Horrell, Dawn Edmiston, and Mackenzie Brady. 2018. The Impact of Positive Psychology on Higher Education. *The William & Mary Educational Review* 5: 12.

Wu, Weilin, Wynne Chin, and Yide Liu. 2022. Technostress and the Smart Hospitality Employee. *Journal of Hospitality and Tourism Technology* 13: 404–26. [CrossRef]

Yap, Chia Keat, and Si Na Kew. 2021. Factors Promoting University Instructor's Resilience to Technostress. In *COVID-19 and Psychology in Malaysia*. London: Routledge, pp. 89–103.

Yener, Serdar, Aykut Arslan, and Sebahattin Kilinç. 2020. The Moderating Roles of Technological Self-Efficacy and Time Management in the Technostress and Employee Performance Relationship through Burnout. *Information Technology & People* 34: 1890–919. [CrossRef]

Zajacova, Anna, Scott M. Lynch, and Thomas J. Espenshade. 2005. Self-Efficacy, Stress, and Academic Success in College. *Research in Higher Education* 46: 677–706. [CrossRef]

Zeijen, Marijntje E. L., Veerle Brenninkmeijer, Maria C. W. Peeters, and Nicole J. J. M. Mastenbroek. 2021. Exploring the Role of Personal Demands in the Health-Impairment Process of the Job Demands-Resources Model: A Study among Master Students. *International Journal of Environmental Research and Public Health* 18: 632. [CrossRef] [PubMed]

Zhang, Aimao. 2012. Peer Assessment of Soft Skills and Hard Skills. *Journal of Information Technology Education: Research* 11: 155–68. [CrossRef] [PubMed]