



Investigating student's motivation and online learning engagement through the lens of self-determination theory

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Abstract

Purpose: The lack of physical contact characterizes the online learning platform; hence, the absence of nonverbal clues could make some learners uncomfortable interacting with others. Thus, understanding the determinants of student's motivation and engagement in online learning platforms is crucial in harnessing digital technology as an enabler of unrestricted and quality educational services.

Design/methodology/approach: Drawing on the self-determination theory (SDT), this study investigates the factors associated with student's motivation to learn (MOL) and their influence on online learning engagement (OLE). Data was collected from 228 university students from the Klang Valley region of Malaysia using the online survey method.

Findings: The results of data analysis using the partial least squares structural equation modelling (PLS-SEM) indicate that self-directed learning (SDL), computer and Internet self-efficacy (CIS), and online communication self-efficacy (OCS) significantly influence MOL. Besides, these factors indirectly influence OLE through MOL.

Originality/value: This study adds to the SDT framework by demonstrating how students' perceptions of autonomy, competence and relatedness through online interaction relate to MOL and OLE.

Keywords: Digital technology, Self-determination theory, Motivation to learn, Online learning engagement, University students, Higher education

1. Introduction

Students' learning and engagement activities have been altered due to the mandated movement restrictions to curtail physical interaction and the spread of the COVID-19 virus, accelerating the adoption of online and digital learning platforms. Although the flexibility and universal reach of digital technologies have ensured the adoption of online learning, the urgent transition necessitated by the outbreak of the COVID-19 pandemic poses significant challenges to both students and instructors (Chiu, 2022; Luo et al., 2021). Student learning engagement captures the willingness, desire, and compulsion to participate in education, which reflects behavioral, emotional, and cognitive dispositions (Reschly & Christenson, 2022). The absence of in-person meetings may limit quality interactions and engagement with materials online (Al-Maskari et

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3 al., 2022; Shah et al., 2021), making non-self-directed learners struggle due to their inability to
4 take the initiative and responsibility for learning (UNESCO, 2022).

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6 Previous studies, primarily from developed economies, link online learning to flexibility and
7 improved access to quality materials (Shah et al., 2021; Rodriguez et al., 2008). Rodriguez et
8 al. (2008) emphasize students' comfort with technology in enhancing online learning. However,
9 in developing economies, insufficient technological and educational resources leave many
10 students struggling and contemplating abandoning education (Al-Maskari et al., 2022). Also,
11 lecturers must recognize potential interruptions in students' Internet access (UNESCO, 2022).
12 Despite digital learning becoming more accessible in Malaysia, some challenges persist (The
13 Star, 2020), such as unreliable internet access and computer self-efficacy, with students in some
14 rural areas climbing trees when writing online exams (Choong, 2020).

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16 Practitioners and policymakers must acknowledge the challenges in transitioning from
17 traditional to computer-based learning (Sanchez-Gordon & Luján-Mora, 2018). Limited
18 interaction in online classes makes some students uncomfortable, neglecting online
19 communication and feeling timid in seeking support. Unlike physical classrooms, online
20 environments hinder spontaneous communication, impacting engagement (Choong, 2020).
21 Assessing online learning effectiveness emphasizes engaged learners, but compromised
22 interaction quality and spontaneity are concerns (Choong, 2020).

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24 Many studies have adopted self-determination theory (SDT) in conceptualizing face-to-face
25 learning. Still, its relevance in an online context is underexplored, particularly in higher
26 education settings (Deci & Ryan, 2020). Drawing on SDT, this study explores shifts in students'
27 interest and engagement by investigating the significance of self-directed learning (SDL),
28 computer and Internet self-efficacy (CIS), and online communication self-efficacy (OCS) in
29 motivating online learning (MOL). Also, it examines whether SDL, CIS, and OCS influence
30 online learning engagement (OLE) through the mediation of MOL. The study contributes
31 evidence on factors influencing students' motivation, enhancing understanding of OLE
32 motivators.

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34 The remaining sections of the paper are arranged as follows. The theoretical background and
35 development of the study's hypotheses are first presented. Then, the study's methodology is
36 described. The results of our analysis are presented, followed by discussions and implications
37 of the findings, and lastly, the conclusions.

2. Theoretical background and hypotheses development

2.1 Online Learning Engagement (OLE)

OLE reflects active participation and cooperation in the learning process through technological resources (Kearsley & Shneiderman, 1998). Access to technology is crucial for effective online learning (Rodriguez et al., 2008), and using technology in education has positive outcomes (Chen et al., 2010). Students' online learning motivation is impacted by information delivery, online medium, and interaction, affecting engagement (Gallagher et al., 2017). Creating an online community enhances students' success and quality of learning (Liu et al., 2007). Students' participation in online learning, a key determinant of outcomes, is linked to recent engagement with technology (Duffy, 2012). Despite available studies on OLE, understanding the impact of students' motivation remains a growing area. Research indicates varied and mixed engagement levels in online learning (Kahn et al., 2017).

2.2 Self-determination theory (SDT)

SDT, an influential theoretical model (Deci & Ryan, 1985), suggests that meeting fundamental needs fosters maturity and satisfaction. Core needs include competence, autonomy, and relatedness, all of which underline motivation (Ryan & Deci, 2011). Intrinsic motivation stems from internal values, while extrinsic motivation relies on external factors (Deci & Ryan, 2012). SDT views individuals as proactive, motivated beings in physical and social contexts. It posits that core psychological needs interact with social influences, shaping positive and negative behaviors (Deci & Ryan, 2012). SDT's theoretical pillars—motivation, choice, and attributions—have applications in various domains, such as health behaviors (Behzadnia et al., 2022), psychotherapy (Moore et al., 2021), sports (Guo & Liem, 2023), and academic change (Howard et al., 2021).

In education, SDT examines the impact of self-talk on students' emotions and perception of new material (Oliver et al., 2010). According to Oliver et al. (2010), students interpreting inner conversation as informative express positive effects, highlighting the importance of fostering autonomy and competence. SDT identifies a continuum from intrinsic to extrinsic motivation (Deci & Ryan, 2012). Intrinsic motivation, driven by self-interests, involves students acting autonomously without external influence (Ryan & Deci, 2011). Intrinsic curiosity and interests increase engagement and satisfaction, fostering autonomy and competence. Educators should leverage students' innate learning propensity to enhance motivation in online learning.

2.3 Hypotheses development

This study proposed a theoretical model (Figure 1) to understand students' motivation and engagement in online learning through the SDT perspective. Autonomy is seen in self-directed learners who take initiative and ownership, competence in their belief in using online technologies, and relatedness in their confidence to communicate with peers. The research model's constructs and hypotheses justification are detailed in the following sections (see Figure 1).

Insert Figure 1 here

2.3.1 Self-directed Learning (SDL)

Learners initiate SDL by assessing needs, setting goals, and strategizing on the most efficient way of learning (Knowles, 1975). Boyer et al. (2014) define it as guided by necessary knowledge, abilities, and attitudes. Garrison (2016) adds time management, progress tracking, and self-motivation as integral components in adult learning. SDL offers a theoretical framework for measuring online student development (Lynch & Dembo, 2004). Autonomy and self-direction are crucial in online learning, enabling students to control and monitor academic achievement (Moore et al., 2021). Self-directed learners understand learning processes and resource requirements and possess motivation, self-control, curiosity, and self-assurance (Tlili et al., 2022). Motivation is critical to SDL; without it, students lack the 'will to learn' (Tlili et al., 2022), impacting responsibility and engagement in online activities.

Studies show SDL significantly impacts online learning involvement (Demir & Horzum, 2013) and enhances success (Song et al., 2022). SDL also influences learners' perception of online learning (Wei & Chou, 2020). This study aims to validate the link between SDL, motivation, and engagement in online learning. Consequently, it is hypothesized that:

H1a. SDL positively influences student's MOL.

H1b. MOL positively mediates the influence of SDL on student's OLE.

2.3.2 Computer and Internet Self-efficacy (CIS)

CIS pertains to a student's confidence and ability to use technology effectively for learning (Adigun & Ndwandwe, 2022). It focuses on learners' confidence in performing computer tasks online (Hsiao et al., 2012). CIS is crucial for technological competence (Ojo et al., 2019), and students' comfort with technology is linked to motivation (Rodriguez et al., 2008). University

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3 students need to be knowledgeable about and prepared to use computers and the Internet in
4 their learning pursuits (Chung et al., 2020).

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7 Self-efficacy, a critical factor in learner success, is particularly influential in learning new
8 technologies (Özüdoğru, 2021). Hatlevik et al. (2018) found that CIS impacts a learner's
9 performance in online learning, converting motivation into learning action. Wang et al. (2013)
10 observed that learners with better CIS control are more content and motivated, leading to
11 improved scores. This research assesses CIS to explore university students' MOL and OLE.
12 Thus, the following hypothesis emphasizes the above analysis:
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18 *H2a. CIS positively influences students' MOL.*

19 *H2b. MOL positively mediates the influence of CIS on student's OLE.*

20 21 22 23 **2.3.3 Online Communication Self-efficacy (OCS)**

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25 OCS is crucial for online learners, helping them overcome communication constraints (Hung
26 et al., 2010). It reflects students' ability to predict online learning performance, influenced by
27 their willingness to engage with others through online technology (Punjani & Mahadevan,
28 2022). Students often hesitate to ask questions in traditional classrooms due to social fears,
29 emphasizing the need for higher self-efficacy in online communication, directly impacting
30 engagement (Chung et al., 2020).
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37 In this study, OCS measures a learner's comfort in using technology for interaction. High self-
38 efficacy in online communication, evident in contributing to discussion and posting questions,
39 correlates with increased engagement (Li et al., 2014). With online learning lacking human
40 contact, communication becomes vital for questions and discussions (Chung et al., 2020).
41 Initiating online discussions enhances engagement, comprehension, and interest (Hung et al.,
42 2010).
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48 OCS significantly correlates with students' motivation in online courses (Kirmizi, 2015).
49 Schellens et al. (2007) noted a positive link between online participation and successful
50 learning engagement. This study views OCS as a crucial determinant of online students'
51 motivation and engagement, proposing the following propositions.
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55 *H3a. OCS positively influences students' MOL.*

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57 *H3b. MOL positively mediates the influence of OCS on student's OLE.*
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2.3.4 Motivation to learn (MOL)

Motivation drives goal-directed action to pursue academic success and rewards (Schunk, 2008). Student motivation is crucial in online learning for effective absorption, recall, and analysis of information and knowledge. Schunk (2008) noted that motivated students adapt to their learning environment, engage in challenging tasks, and demonstrate improved outcomes and persistence. Intrinsic and extrinsic motivation are crucial for online learning success, where the former involves emotional and physical development influencing life choices, and the latter relies on external rewards (Deci & Ryan, 2000). Despite technology integration, positive effects on students' motivation may not be guaranteed. Educators must consider students' motivation when transitioning from traditional to online classes (Nurshahidah et al., 2021). Cognitive variables like motivation significantly influence online learners' performance and success (Alhadabi & Karpinski, 2020). Chen et al. (2019) state that university students perceive online learning as beneficial for improving motivation.

Chung et al. (2020) establish a strong correlation between motivation and online students' engagement in learning. University students' motivation increases through frequent online interaction with lecturers, tracking attendance, and creating learning resources (Doculan, 2016). Hence, students' MOL and engagement are closely linked. Therefore, the following is proposed:

H4. *MOL positively influences student's OLE.*

3. Methods

3.1 Sample and data collection

Data were gathered from undergraduate and postgraduate students in the Klang Valley region of Malaysia, encompassing Kuala Lumpur and Selangor State, Malaysia's most populous and diverse (Ojo et al., 2022). Respondents were conveniently sampled from the researchers' networks, and a Google form questionnaire was emailed to the respondents, encouraging them to also share within their networks. A cover letter clarified study objectives solicited voluntary participation, and assured anonymity. After two months, 228 usable responses were collected from students at four private and three public universities in the Klang Valley, surpassing the minimum sample size of 146 from G*Power analysis. Demographic profiles are summarized in Table 1.

Insert Table 1 here

3.2 Measurement

Four items from Hung et al. (2010) gauged SDL, capturing students' attitudes, abilities, personality traits, and affective responses fostering autonomy in online learning. For CIS, three items from Hung et al. (2010) reflected students' perception of competence in using technology for learning. OCS was measured with three items adapted from Hung et al. (2010), indicating students' confidence in online interaction. MOL used eight items from the motivated strategies for learning questionnaire (Pintrich et al., 1991), while 12 items from the online student engagement scale (Dixson, 2005) assessed OLE. Measurement indicators for variables are in the Appendix.

3.3 Data Analysis Procedure

The partial least squares (PLS) path method was used in evaluating the measurement and structural models. PLS, a variance-based structural equation modeling (SEM) approach, was chosen due to its robustness and resilience to model misspecification, unlike covariance-based SEM (Hair et al., 2017). PLS employs a composite modeling approach, combining indicators to represent specific constructs (Peng & Lai, 2012). Hair et al. (2017) advocate PLS for modified models that predict target constructs, making it suitable for this study's objectives and hypotheses validation.

4. Results

4.1 Measurement model

In evaluating convergent validity, factors loadings, average variance extracted (AVE), and composite reliability (CR) were examined against recommended benchmarks. As depicted in Figure 2, all item factor loadings, ranging from 0.694 to 0.914, surpassed the 0.5 threshold. Additionally, AVE values (0.590 to 0.788) exceeded the minimum 0.50, and composite reliability values (0.885 to 0.947) surpassed the 0.70 cut-off (refer to Table 2). Hence, the criteria for convergent validity were met.

Insert Figure 2 here

This study assessed discriminant validity for latent variables using Fornell-Larcker's criterion, and the findings are outlined in Table 2. As shown in Table 2, the results met the requirements for discriminant validity, with off-diagonal elements (correlations between latent variables) being smaller than the square root of the respective AVEs (diagonal elements) (Fornell & Larcker, 1981; Henseler et al., 2009).

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Insert Table 2 here

4.2 Structural model

The validated structural model (see Figure 3) was used to assess hypothesized relationships based on the coefficient of determination (R^2), path coefficient, and level of significance for each hypothesis (Hair et al. (2017). The R^2 value of 0.652 indicates that SDL, CIS, and OCS account for 65.2% of the variance in MOL. Also, the overall model explains 61.9% of the variance in OLE ($R^2 = 0.619$). The statistical significances of path coefficients were determined using bootstrap analysis (resampling size = 1000). The hypothesized paths from SDL, CIS, and OCS to MOL were all significant ($\beta = 0.319$, $p < 0.001$; $\beta = 0.315$, $p < 0.001$; $\beta = 0.292$, $p < 0.001$, respectively). MOL significantly predicted learning engagement ($\beta = 0.787$, $p < 0.001$). Therefore, H1a, H2a, H3a, and H4 were supported.

Insert Figure 3 here

4.3 Mediating Model

The mediation model, tested with the bootstrapping method (1,000 samples, 95% confidence interval), confirmed significant indirect effects. The paths from SDL ($\beta = 0.251$, $p < 0.001$, 95% CI: 0.150–0.353), CIS ($\beta = 0.248$, $p < 0.001$, 95% CI: 0.140–0.359), and OCS ($\beta = 0.230$, $p < 0.001$, 95% CI: 0.142–0.307), to OLE through MOL were significant. Thus, H1b, H2b, and H3b were supported (Preacher and Hayes, 2008).

4.4 Predictive Relevance (Q^2)

Following Henseler et al. (2009), the model's predictive capability was evaluated using the predictive sample reuse technique (i.e., Stone-Geisser's Q^2). This analysis was computed with the aid of the blindfolding procedure. According to Hair et al. (2017), the predictive relevance of the exogenous construct on the endogenous construct becomes acceptable when the Q^2 value is greater than zero. The Q^2 of MOL and OLE were 0.415 and 0.338, respectively, indicating that the research model has satisfactory predictive relevance.

5. Discussion and implication

5.1 Discussion

Universities swiftly shifted to deploy online learning platforms due to restricted physical interactions during the COVID-19 pandemic. Unlike traditional classrooms, online learning limits two-way interactions, affecting student attitudes and motivation. Non-verbal cues, essential for effective communication, are mostly absent in online platforms, causing

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3 discomfort for some students. Drawing from SDT, this study explores factors influencing
4 student motivation and engagement in online learning. Results show that autonomy,
5 competence, and relatedness impact students' motivation and engagement in online learning.
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9 The study aligns with existing literature (Song et al., 2022; Wei & Chou, 2020), reinforcing
10 the link between SDL and MOL. This supports the idea that students with autonomy, seen in
11 self-directed learners taking initiative and ownership, exhibit a significant association with
12 MOL. Such learners embrace responsibility and pace their learning, aligning with SDT's
13 premise that high autonomy correlates with increased MOL. Hence, commitment to online
14 learning is tied to one's willingness to control and own the learning process.
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20 In line with prior research (Özüdoğru, 2021; Wang et al., 2013), CIS and OCS (Chung et al.,
21 2020; Punjani & Mahadevan, 2022) were strongly related to MOL. Self-efficacy reflects
22 students' confidence in using computers and the Internet, influencing their perceptions of
23 competence. Students who perceive themselves as competent and confident in utilizing online
24 tools are motivated to learn online. The significance of OCS underscores its role in shaping
25 learning motivation; students confidence in interacting with instructors and peers are likely to
26 develop strong relationships, stimulating interest in the learning platform.
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33 This study's data supports the role of MOL in mediating the influences of SDL, CIS, and OCS
34 on OLE. Learning motivation guides the effects of autonomy, competence, and relatedness in
35 shaping students' engagement on online platforms. Self-directed learners take responsibility for
36 their learning and show high motivation for online engagement. Their confidence level
37 influences motivation to use online tools and communicate. Less proficient students, lacking
38 motivation, perform poorly in using online platforms and tools. Motivation plays a key role in
39 linking competence to behavior. According to Hatlevik et al. (2018), students with low
40 confidence in communication may experience reduced engagement in online platforms,
41 fostering apprehension and low morale. As highlighted by Chung et al. (2020), low engagement
42 in online learning platforms could be reinforced among students who lack the confidence to
43 communicate, i.e., ask questions, creating a sense of apprehension and low morale for online
44 learning.
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54 **5.2 Implications of Study**

55 This study explored various aspects within the SDT framework (SDL, self-efficacy, motivation,
56 and engagement), offering a comprehensive view of online learning behavior. This approach
57 enhances the theory's applicability in describing intricate educational behaviors. Specifically,
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3 the study validates and applies SDT in the online learning context, showcasing how autonomy,
4 competence, and relatedness align with factors influencing engagement. Examination of SDL,
5 CIS and OCS underscores the importance of taking responsibility, technology competencies
6 and online social skills in online learning, shedding light on their impact on motivation and
7 engagement. By analyzing motivation as a mediating variable, the study contributes to
8 understanding how SDT's proposed motivational elements interact in the online learning
9 environment, emphasizing the theory's effectiveness in explaining OLE through this mediating
10 variable.

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12 The study's practical implications suggest actions for educators and institutions to enhance
13 motivation and engagement in online learning. Educators can promote SDL, support students'
14 technology competence, and enhance online communication skills. Fostering autonomy,
15 building technology competence, and improving online communication positively impact
16 motivation and engagement (Han, 2021; Maddens et al., 2023). Recognizing the influence of
17 SDL may lead to more learner-centered and self-paced elements in online courses, offering
18 choices in content, assignments, and assessments. Institutions should provide technological
19 training to improve students' CIS, helping them gain confidence and navigate challenges.
20 Recognizing the impact of OCS, educators can encourage collaborative activities for
21 meaningful connections, enhancing students' sense of belonging, motivation, and engagement.
22 Additionally, the study underscores the importance of providing constructive feedback and
23 acknowledging achievements, aligning with SDT's emphasis on competence and autonomy to
24 boost motivation and engagement.

25 **5.3 Limitations and future research**

26 This research has limitations that future studies could address. The cross-sectional design
27 hinders establishing causal relationships, and reliance on self-report measures may introduce
28 response biases. Future research could use longitudinal designs and mixed-methods approaches
29 for more reliable data. Generalizability could be enhanced by exploring how cultural
30 differences influence the relationships among variables. Examining peer relationships and
31 social dynamics in online learning settings can deepen understanding of student involvement.
32 Incorporating insights from self-regulated learning strategies like time management and critical
33 thinking can provide a better understanding of how students control their learning processes in
34 digital environments. Considering social presence factors, such as learners' experiences, in
35 future studies can guide successful educational practices in online learning.

6. Conclusion

In conclusion, exploring students' MOL and OLE through SDT reveals key connections for compelling digital learning. The study, focused on online education, yields significant findings benefiting theoretical understanding and practical application. The supported hypotheses underscore SDT's relevance in understanding online education dynamics. These findings illuminate factors driving student engagement in virtual learning settings, aligning with SDT principles. Autonomy, technological competencies, and effective online communication, as per SDT, play crucial roles in fostering deeper motivation and engagement. The study affirms SDT's applicability in explaining mechanisms influencing students' motivation and engagement in online learning.

Furthermore, the results have valuable implications for educational practice. Educators and institutions can use insights from this study to design more effective online curricula and experiences. Focusing on fostering SDL, improving tech self-efficacy, and promoting online communication enhances students' intrinsic motivation, ultimately boosting engagement. This study is a practical guide for pedagogical strategies to enrich online education and enhance students' learning experiences.

Data Availability – Data will be made available upon reasonable request.

References

- Adigun, O. T., & Ndwandwe, N. (2022). Academic resilience among deaf learners during e-learning in the COVID-19 era. *Research in Social Sciences and Technology*, 7(2), 27–48. <https://doi.org/10.46303/ressat.2022.8>
- Al-Maskari, A., Al Riyami, T. and Ghnimi, S. (2022). Factors affecting students' preparedness for the fourth industrial revolution in higher education institutions. *Journal of Applied Research in Higher Education*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/JARHE-05-2022-0169>
- Alhadabi, A., & Karpinski, A. C. (2020). Grit, self-efficacy, achievement orientation goals, and academic performance in University students. *International Journal of Adolescence and Youth*, 25(1), 519–535. <https://doi.org/10.1080/02673843.2019.1679202>
- Basar, Z. M., Mansor, A. N., Jamaludin, K. A., & Alias, B. S. (2021). The effectiveness and challenges of online learning for secondary school students—A case study. *Asian Journal of University Education*, 17(3), 119–129.
- Behzadnia, B., Alizadeh, E., Haerens, L., & Aghdasi, M. T. (2022). Changes in students' goal pursuits and motivational regulations toward healthy behaviors during the pandemic: A Self-Determination Theory perspective. *Psychology of Sport and Exercise*, 59. <https://doi.org/10.1016/j.psychsport.2021.102131>

- 1
2
3 Boyer, S. L., Edmondson, D. R., Artis, A. B., & Fleming, D. (2014). Self-directed learning: A
4 tool for lifelong learning. *Journal of Marketing Education*, 36(1), 20–32.
5 <https://doi.org/10.1177/0273475313494010>
6
7
8 Chen, C. M., Chen, L. C., & Yang, S. M. (2019). An English vocabulary learning app with
9 self-regulated learning mechanism to improve learning performance and motivation. *Computer*
10 *Assisted Language Learning*, 32(3), 237–260.
11 <https://doi.org/10.1080/09588221.2018.1485708>
12
13
14 Chen, P.-S. D., Lambert, A. D., & Guidry, K. R. (2010). Engaging online learners: The impact
15 of Web-based learning technology on college student engagement. *Computers & Education*,
16 54(4), 1222–1232.
17
18
19 Chiu, T. K. F. (2022). Applying the self-determination theory (SDT) to explain student
20 engagement in online learning during the COVID-19 pandemic. *Journal of Research on*
21 *Technology in Education*, 54(S1), S14–S30. <https://doi.org/10.1080/15391523.2021.1891998>
22
23
24 Choong, P. Y. (2020). *Covid-19: Impact on the Tertiary Education Sector in Malaysia*. Penang
25 Institute. [https://penanginstitute.org/publications/covid-19-crisis-assessments/covid-19-](https://penanginstitute.org/publications/covid-19-crisis-assessments/covid-19-impact-on-the-tertiary-education-sector-in-malaysia/)
26 [impact-on-the-tertiary-education-sector-in-malaysia/](https://penanginstitute.org/publications/covid-19-crisis-assessments/covid-19-impact-on-the-tertiary-education-sector-in-malaysia/)
27
28
29 Chung, E., N., N. M., & Mathew V. N. (2020). Are you ready? An assessment of online
30 learning readiness among university students. *International Journal of Academic Research in*
31 *Progressive Education and Development*, 9(1), 301–317.
32
33
34 Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human
35 behavior. *Intrinsic Motivation and Self-Determination in Human Behavior*.
36 <https://doi.org/10.1007/978-1-4899-2271-7>
37
38
39 Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and
40 the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268.
41 https://doi.org/10.1207/S15327965PLI1104_01
42
43
44 Deci, E. L., & Ryan, R. M. (2012). Motivation, Personality, and Development Within
45 Embedded Social Contexts: An Overview of Self-Determination Theory. *The Oxford*
46 *Handbook of Human Motivation*. <https://doi.org/10.1093/oxfordhb/9780195399820.013.0006>
47
48
49 Deci, E. L., & Ryan, R. M. (2020). Intrinsic and extrinsic motivation from a self-determination
50 theory perspective: Definitions, theory, practices, and future directions. *Contemporary*
51 *Educational Psychology*, 61(10.1016).
52
53
54 Demir, K. Z., & Horzum, M. B. (2013). Relationship between online learning readiness and
55 structure and interaction of online learning students. *Kuram ve Uygulamada Egitim Bilimleri*,
56 13(3), 1792–1797. <https://doi.org/10.12738/estp.2013.3.1580>
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3 Doculan, J. A. D. (2016). E-Learning Readiness Assessment Tool for Philippine Higher
4 Education Institutions. *International Journal on Integrating Technology in Education*, 5(2),
5 33–43. <https://doi.org/10.5121/ijite.2016.5203>
6
7
8 Duffy, P. (2012). Engaging the YouTube Google-Eyed Generation: Strategies for Using Web.
9 *Leading Issues in E-Learning Research For Researchers, Teachers and Students*, 1, 47.
10
11 Gallagher, S. E., O'Dulain, M., O'Mahony, N., Kehoe, C., McCarthy, F., & Morgan, G. (2017).
12 Instructor-provided summary infographics to support online learning. *Educational Media*
13 *International*, 54(2), 129–147.
14
15
16 Garrison, D. R. (2016). E-learning in the 21st century: A community of inquiry framework for
17 research and practice (3rd edition). In *E-Learning in the 21st Century: A Community of Inquiry*
18 *Framework for Research and Practice, Third Edition*. <https://doi.org/10.4324/9781315667263>
19
20
21 Guo, G. Q., & Liem, G. A. D. (2023). The impact of co-curricular activities on youth
22 development: A self-determination theory perspective. *Trends in Psychology*.
23 <https://doi.org/10.1007/s43076-022-00249-5>
24
25
26 Hagenauer, G., Gläser-Zikuda, M., & Moschner, B. (2018). University students' emotions, life-
27 satisfaction and study commitment: A self-determination theoretical perspective. *Journal of*
28 *Further and Higher Education*, 42(6), 808–826.
29 <https://doi.org/10.1080/0309877X.2017.1323189>
30
31
32 Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least*
33 *Squares Structural Equation Modeling (PLS-SEM)*. Thousand Oaks, CA: Sage.
34
35
36 Han, K. (2021). Fostering students' autonomy and engagement in EFL classroom through
37 proximal classroom factors: Autonomy-supportive behaviors and student-teacher relationships.
38 *Frontiers in Psychology*, 12, 767079.
39
40
41 Hatlevik, O. E., Throndsen, I., Loi, M., & Gudmundsdottir, G. B. (2018). Students' ICT self-
42 efficacy and computer and information literacy: Determinants and relationships. *Computers*
43 *and Education*, 118, 107–119. <https://doi.org/10.1016/j.compedu.2017.11.011>
44
45
46 Henseler, J., Ringle, C. M., & Sinkovics, R. (2009). The use of partial least squares path
47 modeling in international marketing. *Advances in International Marketing*, 20(2009), 277–319.
48 [https://doi.org/10.1108/S1474-7979\(2009\)0000020014](https://doi.org/10.1108/S1474-7979(2009)0000020014)
49
50
51 Howard, J. L., Bureau, J., Guay, F., Chong, J. X. Y., & Ryan, R. M. (2021). Student motivation
52 and associated outcomes: A meta-analysis from self-determination theory. *Perspectives on*
53 *Psychological Science*, 16(6), 1300–1323. <https://doi.org/10.1177/1745691620966789>
54
55
56 Hsiao, H. C., Tu, Y. L., & Chung, H. N. (2012). Perceived social supports, computer self-
57 efficacy, and computer use among high school students. *Turkish Online Journal of Educational*
58 *Technology*, 11(2), 167–177.
59
60
61 Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010). Learner readiness for online learning:
62 Scale development and student perceptions. *Computers and Education*, 55(3), 1080–1090.
63 <https://doi.org/10.1016/j.compedu.2010.05.004>

- 1
2
3 Kahn, P., Everington, L., Kelm, K., Reid, I., & Watkins, F. (2017). Understanding student
4 engagement in online learning environments: The role of reflexivity. *Educational Technology*
5 *Research and Development*, 65, 203–218.
- 6
7
8 Kearsley, G., & Shneiderman, B. (1998). Engagement Theory: A Framework for Technology-
9 Based Teaching and Learning. *Educational Technology*, 38(5), 20–23. JSTOR.
- 10
11 Kirmizi, Ö. (2015). The influence of learner readiness on student satisfaction and academic
12 achievement in an online program at higher education. *Turkish Online Journal of Educational*
13 *Technology*, 14(1), 133–142.
- 14
15
16 Knowles, M. S. (1975). Self-directed learning, A guide for learners and teachers. In *The*
17 *Journal of Continuing Education in Nursing*.
- 18
19 Li, C., Shi, X., & Dang, J. (2014). Online communication and subjective well-being in Chinese
20 college students: The mediating role of shyness and social self-efficacy. *Computers in Human*
21 *Behavior*, 34, 89–95. <https://doi.org/10.1016/j.chb.2014.01.032>
- 22
23
24 Liu, X., Magjuka, R. J., Bonk, C. J., & Lee, S. (2007). *DOES SENSE OF COMMUNITY*
25 *MATTER? An Examination of Participants' Perceptions of Building Learning Communities in*
26 *Online Courses*. 8(1).
- 27
28
29 Lourenço, J., Almagro, B. J., Carmona-Márquez, J., & Sáenz-López, P. (2022). Predicting
30 perceived sport performance via self-determination Theory. *Perceptual and Motor Skills*,
31 129(5), 1563–1580. <https://doi.org/10.1177/00315125221119121>
- 32
33
34 Luo, Y., Geng, C., Pei, X., Chen, X., & Zou, Z. (2021). The evaluation of the distance learning
35 combining webinars and virtual simulations for senior nursing students during the COVID-19
36 period. *Clinical Simulation in Nursing*, 57, 31–40. <https://doi.org/10.1016/j.ecns.2021.04.022>
- 37
38
39 Lynch, R., & Dembo, M. (2004). The relationship between self-regulation and online learning
40 in a blended learning context. *International Review of Research in Open and Distance*
41 *Learning*, 5(2). <https://doi.org/10.19173/irrodl.v5i2.189>
- 42
43
44 Maddens, L., Depaepe, F., Raes, A., & Elen, J. (2023). Fostering students' motivation towards
45 learning research skills: The role of autonomy, competence and relatedness support.
46 *Instructional Science*, 51(1), 165–199. <https://doi.org/10.1007/s11251-022-09606-4>
- 47
48
49 Moore, E., Holding, A. C., Moore, A., Levine, S. L., Powers, T. A., Zuroff, D. C., & Koestner,
50 R. (2021). The role of goal-related autonomy: A self-determination theory analysis of
51 perfectionism, poor goal progress, and depressive symptoms. *Journal of Counseling*
52 *Psychology*, 68(1), 88–97. <https://doi.org/10.1037/cou0000438>
- 53
54
55 Nurshahidah, S. A. S., Sufiean, H. M., Rauf, R. A., Yazmin, Y. F., Shafezah, A. W., & Hamidah,
56 I. (2021). The effect of new online learning readiness on perceived usefulness of open distance
57 learning implementation during Covid-19 outbreak. *AIP Conference Proceedings*, 2347.
58 <https://doi.org/10.1063/5.0051618>
- 59
60 Ojo, A. O., Alias, M., Dorasamy, M., Sarwar, A., & Ojo, O. T. (2022). Moderating Effects of
Opportunity on the Cognitive and Motivational Factors of Internet Engagement: A Study of

1
2
3 the Digital Divide in Malaysia. *International Journal of Technology and Human Interaction*,
4 18(1), 1–17. <https://doi.org/10.4018/IJTHI.299353>

5
6 Ojo, A.O., Arasanmi, C.N., Raman, M., & Tan, C.N.L. (2019). Ability, motivation, opportunity
7 and sociodemographic determinants of Internet usage in Malaysia. *Information Development*,
8 35(5), 819 - 830.

9
10
11 Oliver, E. J., Markland, D., & Hardy, J. (2010). Interpretation of self-talk and post-lecture
12 affective states of higher education students: A self-determination theory perspective. *British*
13 *Journal of Educational Psychology*, 80(2), 307–323.
14 <https://doi.org/10.1348/000709909X477215>

15
16
17 Özüdoğru, G. (2021). The effect of distance education on self-efficacy towards online
18 technologies and motivation for online learning. *Journal of Learning and Teaching in Digital*
19 *Age*. <https://doi.org/10.53850/joltida.1003915>

20
21
22 Pintrich, P., Smith, D., García, T., & McKeachie, W. (1991). A manual for the use of the
23 motivated strategies for learning questionnaire (MSLQ). Ann Arbor, MI: University of
24 Michigan.

25
26
27 Punjani K.K., & Mahadevan K. (2022). Transitioning to online learning in higher education:
28 influence of awareness of covid-19 and self-efficacy on perceived net benefits and intention.
29 *Education & Information Technology*. 27(1), 291-320. [https://doi.org/10.1007/s10639-021-](https://doi.org/10.1007/s10639-021-10665-2)
30 [10665-2](https://doi.org/10.1007/s10639-021-10665-2)

31
32
33 Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and
34 comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3),
35 879–891. <https://doi.org/10.3758/BRM.40.3.879>

36
37
38 Reschly, A. L., & Christenson, S. L. (2022). Handbook of Research on Student Engagement.
39 In *Handbook of Research on Student Engagement*. Springer-Verlag New York Inc.
40 <https://doi.org/10.1007/978-3-031-07853-8>

41
42
43 Rodriguez, M. C., Ooms, A., & Montañez, M. (2008). Students' perceptions of online-learning
44 quality given comfort, motivation, satisfaction, and experience. *Journal of Interactive Online*
45 *Learning*, 7(2), 105-125.

46
47
48 Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and
49 new directions. *Contemporary Educational Psychology*, 25(1), 54–67.
50 <https://doi.org/10.1006/ceps.1999.1020>

51
52
53 Ryan, R. M., & Deci, E. L. (2011). A self-determination theory perspective on social,
54 institutional, cultural, and economic supports for autonomy and their importance for well-being.
55 In V. I. Chirkov, R. M. Ryan, & K. M. Sheldon (Eds.), *Human autonomy in cross-cultural*
56 *context: Perspectives on the psychology of agency, freedom, and well-being* (pp. 45–64).
57 Springer Science + Business Media. https://doi.org/10.1007/978-90-481-9667-8_345-64.
58 https://doi.org/10.1007/978-90-481-9667-8_3

Sanchez-Gordon, S., & Luján-Mora, S. (2018). Technological innovations in large-scale teaching: Five roots of massive open online courses. *Journal of Educational Computing Research, 56*(5), 623–644. <https://doi.org/10.1177/0735633117727597>

Schellens, T., Van Keer, H., De Wever, B., & Valcke, M. (2007). Scripting by assigning roles: Does it improve knowledge construction in asynchronous discussion groups? *International Journal of Computer-Supported Collaborative Learning, 2*(2–3), 225–246. <https://doi.org/10.1007/s11412-007-9016-2>

Schunk, D. H. (2008). Metacognition, self-regulation, and self-regulated learning: Research recommendations. *Educational Psychology Review, 20*(4), 463–467. <https://doi.org/10.1007/s10648-008-9086-3>

Shah, S. S., Shah, A. A., Memon, F., Kemal, A. A., & Soomro, A. (2021). Online learning during the COVID-19 pandemic: Applying the self-determination theory in the 'new normal.' *Revista de Psicodidactica, 26*(2), 169–178. <https://doi.org/10.1016/j.psicod.2020.12.004>

Song, Y., Lee, Y., & Lee, J. (2022). Mediating effects of self-directed learning on the relationship between critical thinking and problem-solving in student nurses attending online classes: A cross-sectional descriptive study. *Nurse Education Today, 109*. <https://doi.org/10.1016/j.nedt.2021.105227>

The Star. (2020). *MCO: Impact of digital divide deepens with e-learning*. The Star Online. <https://www.thestar.com.my/news/nation/2020/04/17/mco-impact-of-digital-divide-deepens-with-e-learning>

Tlili, A., Burgos, D., Olivier, J., & Huang, R. (2022). Self-directed learning and assessment in a crisis context: The COVID-19 pandemic as a case study. *Journal of E-Learning and Knowledge Society, 18*(2), 1–10. <https://doi.org/10.20368/1971-8829/1135475>

UNESCO. (2022). *Education: From disruption to recovery*. <https://en.unesco.org/covid19/educationresponse>

Vansteenkiste, M., Aelterman, N., Haerens, L., & Soenens, B. (2019). Seeking stability in stormy educational times: A need-based perspective on (de)motivating teaching grounded in self-determination theory. *Advances in Motivation and Achievement, 20*, 53–80. <https://doi.org/10.1108/S0749-742320190000020004>

Wang, C., Harris, J., & Patterson, P. (2013). The roles of habit, self-efficacy, and satisfaction in driving continued use of self-service technologies: A longitudinal study. *Journal of Service Research, 16*(3), 400–414.

Wei, H. C., & Chou, C. (2020). Online learning performance and satisfaction: Do perceptions and readiness matter? *Distance Education, 41*(1), 48–69. <https://doi.org/10.1080/01587919.2020.1724768>

Williams, G. C., & Heather, P. (2012). Self-determination theory: Its application to health behavior and complementarity with motivational interviewing. *International Journal of Behavioral Nutrition and Physical Activity, 18*.

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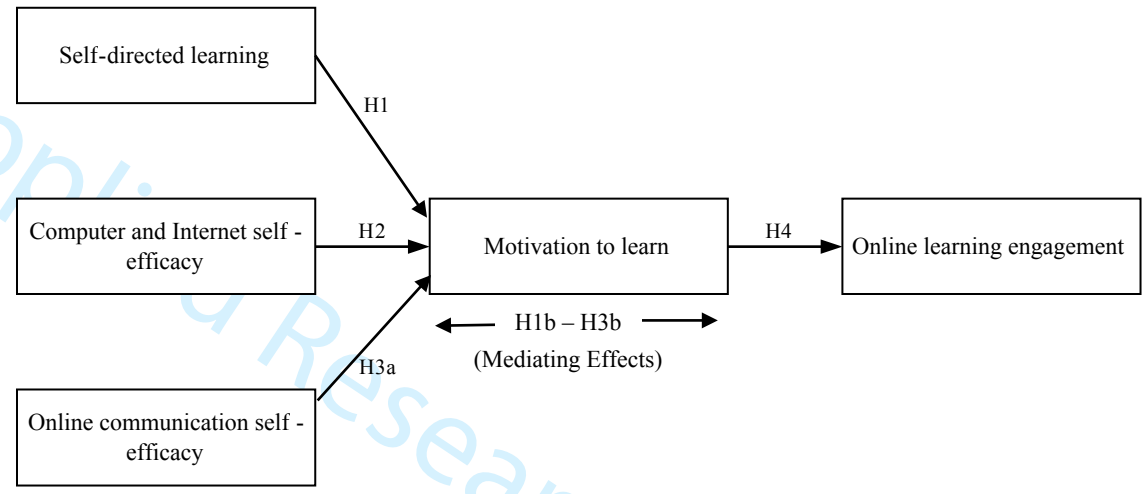


Figure 1. Research Model

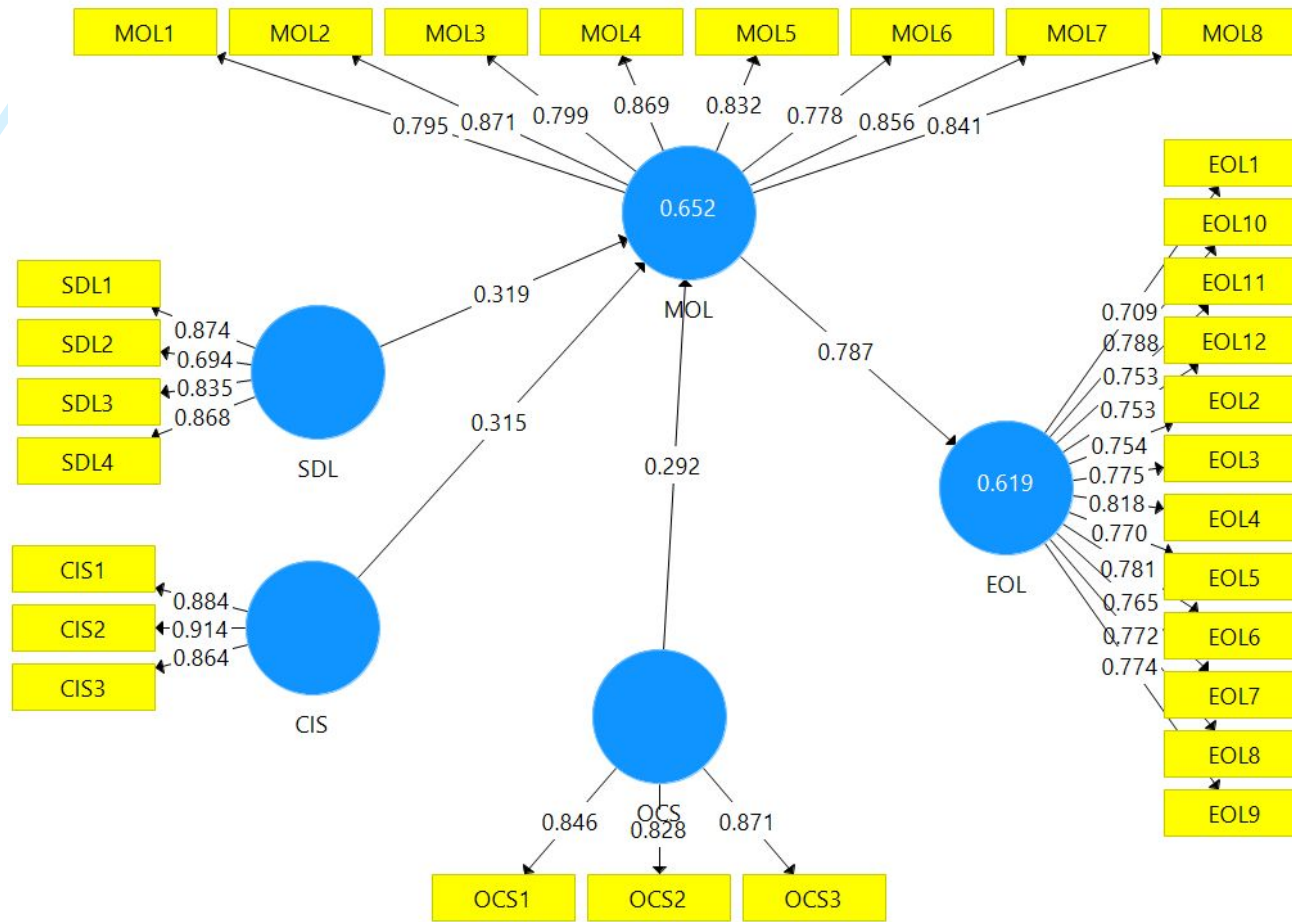


Figure 2. Measurement Model

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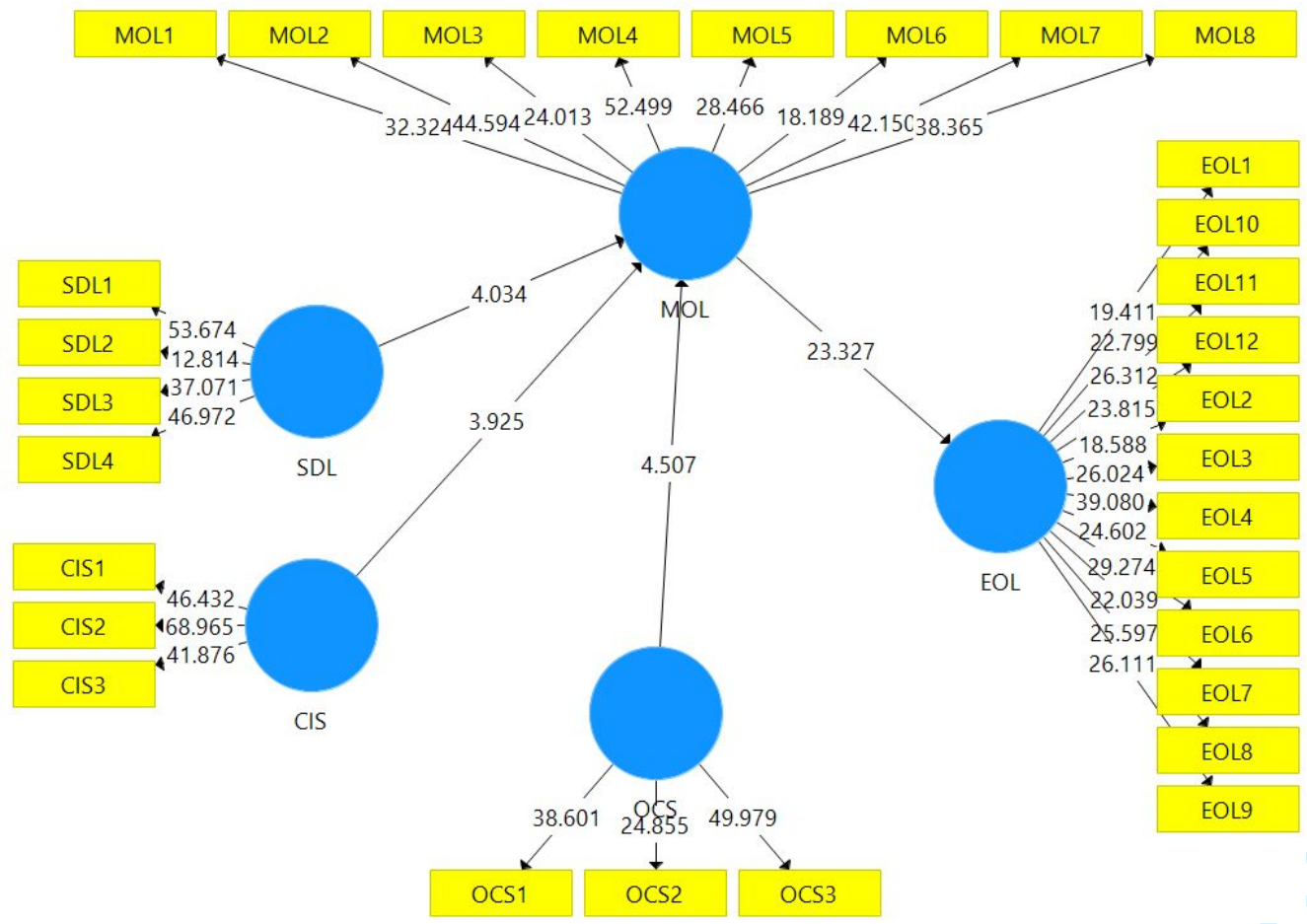


Figure 3. Structural Model

Education

Table 1. Demographic Profile

		Frequency	Percentage
Gender	Male	94	41.2
	Female	134	58.8
Age	Below 20 years	28	12.3
	20 – 24 years	152	66.7
	25 – 29 years	39	17.1
	30 & above years	9	3.9
Level of Study	Diploma	39	17.1
	Bachelor	164	71.9
	Post Graduate	25	11.0

Table 2. Results of Convergent & Discriminant Validity

Variables	AVE	CR	1	2	3	4	5
1. CIS	0.788	0.918	0.888				
2. OCS	0.720	0.885	0.648	0.848			
3. SDL	0.674	0.891	0.580	0.699	0.821		
4. MOL	0.690	0.947	0.689	0.719	0.706	0.831	
5. EOL	0.590	0.945	0.669	0.696	0.756	0.787	0.768

Note: CIS – Computer and Internet Self-efficacy; OCS – Online Communication Self-efficacy; SDL – Self-determined Learning; MOL – Motivation to Learn; Online Learning Engagement; AVE-Average Variance Extracted; CR-Composite Reliability; The bold diagonal items are the square root of the AVEs

Appendix – Variables Measurement Indicators

Self Directed Learning (Hung et al., 2010)

I have a personal study plan.

I manage my time well.

I set up my online learning goals.

I have higher expectations for my learning performance.

Online communication self-efficacy (Hung et al., 2010)

I feel confident using online tools (Email/discussion) to communicate effectively.

I feel confident expressing myself (Emotions and humour) through thoughts, text messages, and posting comments.

I feel confident in posting questions in online discussions.

Computer and Internet self-efficacy (Hung et al., 2010)

I feel confident in performing basic functions of Microsoft Office programs (MSWord, MS Excel, MS PowerPoint).

I feel confident in my knowledge and skills of managing software for online learning.

I feel confident using the Internet (Google) to find or gather information for online learning.

Motivation to Learn (Pintrich et al., 2011)

I prefer an assessment that is challenging to learn new things.

It is important for me to learn what the assessments teach me.

I think I can use what I learn in online classes in other classes.

I choose topics where I will learn something from, even if they require more effort.

Even when I do poorly during an assessment, I try to learn from my mistakes.

I think it is useful to know what I am learning in a class.

I think that what I learn in class is interesting.

Understanding a topic taught in class is important to me.

Online Learning Engagement (Dixson et al., 2015)

I stay up for the readings.

I look over class notes in between getting online lessons to ensure I understand the material.

I take notes over readings and video lectures.

I listen and read carefully during online classes.

I find ways to make the course relevant to my life.

I participate actively in small-group discussions or forums conducted during online classes.

I help fellow students (classmates).

I ensure I get a good grade.

I ensure I do well in tests/quizzes conducted in online classes.

I engage in online conversations with others (Chat, Discussions, Email)

I keep posting in the discussion forum regularly.

I put in effort to get to know other students in the class.
