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# EXAMINING THE INFLUENCE OF INTERACTION ON STUDENT SATISFACTION VIA FLOW EXPERIENCE AMONG DISTANCE LEARNERS IN MALAYSIA

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**Abstract:**

Lifelong learning has emerged as a global priority in the Malaysia Education Blueprint 2015 - 2025 for addressing many challenges of sustainable development. Meanwhile, in an online setting, learners have fewer possibilities to interact with higher education institutions. There have been several studies related to interaction, flow, and student satisfaction. Nevertheless, it is relevant to western countries and traditional students. This study intended to assess how different kinds of interaction (between learners, course materials, instructors, and other learners) influenced student satisfaction among Malaysian distance learners. Moore's Transactional Distance Theory (1989), which explains how people interact, is a key part of the research framework for this study. The current research involved 270 respondents that conform to the inclusion criteria, and SPSS was used to analyze the hypotheses. Organization and instructor may use the results in embracing a user-friendly educational experience with versatile virtual professional assistance, which is crucial for rigorous online courses. For that reason, this study will provide an overview and opportunities to communicate, cooperate, and gain input for social reinforcement.

**Keywords:**

Interactions; Flow Experience; Student Satisfaction

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## Introduction

In line with other challenges occurring in the world of distance learners' success in ODL is the number of learning interactions and interactivity made available for the learners. In line with the suggestion by Blueprint on enculturation of lifelong learning for Malaysia 2011-2021, ODL institutions are to capitalize on ICT and other appreciative technologies to effectively and efficiently deliver their programs to the satisfaction of the lifelong learners. Learners who demonstrate impressive cognitive self-regulation may succeed effectively in academics whilst controlling their satisfaction and behavioral stimuli. Institutions of tertiary learning are recognized as economic key elements while they generate equal intellectual resources and revamped information. Online learning is associated with a pedagogical approach that takes dwelling over the internet as a channel for remote education and learning experiences for both instructors and learners from diverse locations (Kim, Brady & Wolters, 2020).

In recent years, e-learning has expanded significantly due to the fact that technology is always evolving and offering us a range of new educational opportunities (Johansson & Smith, 2020). In recent years, numerous e-learning systems and infrastructures have been presented (Hanna et al., 2020). The contemporary world requires a lifetime of study because every educated individual needs a plethora of expertise. Learning from a distance can assist in addressing this challenge (Kovbasnyuk & Styfanyshyn, 2020). Arranging for distant learning is no longer a problem in the era of the latest technology.

Distance learners may use learning technologies such as mobile gadgets and well-established forms (Cross et al., 2019). According to a McKinsey analysis published in 2018, just 7% of institutions were completely equipped to handle the talent gaps. To avoid this issue, the workforce's cognitive skill sets must be enhanced (Hunt et al., 2018). Every Malaysian will adopt a culture of lifelong learning [Malaysia Education Blueprint 2015 - 2025 (Higher Education)]. Independence and self-direction of the student are among the most crucial characteristics of lifelong learning (Qalehsari, Khaghanizadeh & Ebadi, 2017).

Higher education is a vital basis for a nation's growth, with a critical role in its advancement and urbanization (Song et al., 2022). In the educational realm, student satisfaction plays a crucial role in assessing and enhancing institutions and upgrading pedagogy (Sahito et. al., 2022). There was a concerted effort by all participants to adapt the distance learning by utilizing the most up-to-date approach to education (Almaiah, Khasawneh & Althunibat, 2020). Correspondingly, online learning acquires access to instructional resources, engages with knowledge and learners, gains assistance in the learning process, and builds personal meaning and success from the learning experiences (Martin et al., 2019).

The education industry was immediately compelled to alter its instructional strategies and operational practices (Corlatean, 2020; Singh & Thurman, 2019). Interactions can be encouraged by incorporating talks into learning systems (Gurajena et al., 2021). Obtaining a well-organized operating environment will keep learners and instructors from becoming worried and dissatisfied (Mashwama et al., 2020). As more asynchronous learning activities are developed, this increases student involvement by making learning more convenient. As technology becomes more accessible and user-friendly, learner engagement is increasing, while alternate modes of assessment (such as asynchronous assessments with a time restriction and open assessments) encourage students to revise and reflect (Aristeidou & Cross, 2021).

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Therefore, the requirement for online learning is to establish an atmosphere that attracts learners and keeps them engaged, interested, and committed during their learning experience. Accessibility parameters have evolved to embrace the ability to sustain gadgets, as information and networking platforms have improved (Bell, Aubele & Perruso, 2022).Online courses, on the other hand, vary significantly from conventional education in how students engage with the teacher, their classmates, and the subject. Students' satisfaction may suffer as a result of inadequate communication (Noel-Levitz, 2011). If students had less frequent interactions with others, their learning activities would be negatively impacted (by a factor of four), their evaluations would tend to suffer (by a factor of six), and their social activities would tend to decline (by a factor of three) (Bao, 2020). There was a threefold increase in the possibility that a student's learning activities would be affected if there was less instructor engagement. Online distance education increases the dropout percentage of learners during the learning process leading to disappointment, sociological dysfunction, and financial damage (Soffer & Cohen, 2019). According to data from one of Malaysia's public institutions, the enrollment rate has decreased over the course of five years, from 2016/2017 to 2021/2022. Consequently, fostering a positive flow experience in online learning is anticipated to increase satisfaction.

## Literature Review

### *Interaction (Learner–Instructor Interaction, Learner–Content Interaction, and Learner–Learner Interaction)*

Learner–instructor interaction, learner–content interaction, and learner–learner interaction are three distinct, but compatible, modes of interaction suggested by Moore (1989). The correlation between a student and an expert is known as learner–instructor interaction (e.g., teacher). The relationship between the student and the subject is known as learner–content contact. Social involvement has a mixed impact on success, happiness, and relationship efficiency. The consistency of the relationship may be a better measure of social involvement and learner engagement than the degree of social involvement (Allred, 2016).

The relationship within a learner and an instructor, such as a lecturer, is known as learner–instructor interaction. The relationship within the learner and the subject matter, such as lessons, practice issues, and others, is known as learner–content interaction. Last but not least, learner–learner interaction is described as verbal communication or written communication between a learner and their friends.

Distance learning platforms have a plethora of options for incorporating interaction into distance classes to aid learning. Interaction, on the other hand, has been seen to be linked to social involvement as social involvement rises, so does interaction, and conversely (Oyarzun, 2016). Whether or not technical technologies are aspect of the instructional process participation is a crucial mechanism for facilitating learning.

The concentration in language learning is on interactions. According to Moore (1989), regression analysis was used to see if the three types of experiences, namely learner-instructor, learner-learner, and learner-content, influenced students' perceptions of success and fulfilment. Multiple regression analysis demonstrated that satisfaction was highly affected by interactions between learners and instructors, as well as interactions between learners and course materials, after adjusting for demographic information, student motivation, and learning styles. Meanwhile, interactions between learners had a limited influence on satisfaction. Engagement

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with the course material was the single factor identified to influence student perceptions of success (Aristeidou & Cross, 2021).

The major emphasis of interaction in all educational situations is conversation; this happens between instructors and students, as well as between instructional materials and learning management systems (Burgess, 2006). Owing to the presence of technology, interaction in online learning settings becomes more complicated. Chang & Smith (2008) contended that Moore's interaction model disregarded the importance of technology, which serves as the medium for all types of engagement in online learning. Moore's model of interaction has been expanded by the researchers to include a fourth form of interaction: learner-interface interaction. Learner-interface interaction refers to the procedures through which students utilize technology to complete an assigned task (Chang & Smith, 2008). Interfaces consist of technologies, platforms, or programs that enable learners to connect online with instructors, classmates, and course materials. In every online learning setting, this sort of engagement is necessary for other types of interaction.

***Flow Experience***

Over the past few years, physiological research has gradually examined flow, and participation in these experiments is rising rapidly. Nevertheless, physiological measures cannot substitute for self-reporting because flow is a subjective personal impression. Extra information and simultaneous computation provide fresh testing chances, which is a benefit (Peifer & Tan, 2021). The inference from Csikszentmihalyi (1990) was that people from an autotelic character get the opportunity across all knowledge sources, which are irregular for the job to be entirely focused on the task at hand, to stop mental activities.

A significant group of scientific work lasting over four decades was based on the flow experience. However, there was progress in recognizing that beyond the limited disclosure of Csikszentmihalyi after his first breakthrough in 1975 (Abuhamdeh, 2020). Furthermore, flow tends to have a beneficial impact on better efficiency, schooling and dedication. Flow defines an individual's condition whereby all unrelated feelings or ideas are fully absorbed in a given task. An individual has a pleasant psychological condition at peak awareness in which an individual is so interested in the goal-led task that nothing else appears to concern (Perttula et. al., 2017).

The institutional definition of flow was defined as the dynamic conjunction of four characteristics: control, attention, curiosity, and interest (Trevino & Webster, 1992). Flow is a holistic sensation where one works with full participation, with a reduction in concentration, and so on. In this research, we will adapt the main flow experience dimension that was constructed by Webster, Trevino and Ryan (1993). Flow is a condition of full participation and increased pressure leading to better task success (Csikszentmihalyi, 1991, 1997).

The idea of flow can offer valuable guidance into the field of mission involvement, but the structure has gained very little scientific attention (Aubrey, 2017). Flow is the situation whereby persons are intimately interested and have knowledge by themselves instead of for some other reason, it has a number of characteristics, including concentrated attention, input, influence, and intrinsic motivation (Csikszentmihalyi, 1975). Flow experiences were favorably correlated with research and participatory practices, and wherein a state of flow, students also display various policies (Hong et al., 2017).

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***Student Satisfaction***

Student satisfaction is a critical aspect of assessing distance learning since it has a significant impact on the consistency of online learning and the performance of students. Indeed, it is impossible to address students' needs and develop their learning without first exploring what makes them happy in distance education courses (Caliskan et al., 2017). Hence, the gap between the level of expectation and the real performance describes student satisfaction level that represents a delightful and productive experience (Khan & Iqbal, 2016).

In educational reflections, there is significant interest in determining which characteristics impact learning outcomes and student satisfaction in higher education e-learning, online learning, and hybrid learning (Nortvig et al., 2018). The marketing perspective of an organization is critical in terms of assessing the success of its processes, as the quality of student satisfaction is a fundamental component of the organization's success. Essential to that fact, we can firmly confirm that student satisfaction in distance learning is an indisputable point.

The quality of student satisfaction is also noteworthy because it signifies that the instructors are engaging with their students in a way that is designated to make them think and understand (Khan & Iqbal, 2016). Solid student satisfaction demonstrates that appropriately engaging teaching approaches are causing students to review and comprehend. The structures used in the course may restrict the interaction between the instructor and the learner as the learner has no or little control over the dimensions of the interaction with the instructor. Satisfaction is a meditation of achievement and pleasure, so learners' subjective views of how much a learning experience encourages academic accomplishment refer to student satisfaction. Furthermore, student satisfaction is among the most influential factors to remember when evaluating online classes, while perceived learning is a good predictor of performance (Alqurashi, 2019).

***Organisational Climate (OC)***

Organisational climate signifies the condition of an organisation's culture. According to Ekman, Lindgren, and Packendorff (2018), the most common management challenge beleaguering organisations is the need for a creative flexible work environment that promotes job satisfaction and innovation. Cobb (2016) revealed that due to being drained by fiscal constraint, downsizing, and outsourcing, organisations have been necessitated to modify dynamics in the workforce that remains accommodating. An IBM study exposed the growing importance of workplace climate on employee job satisfaction, creativity, motivation, and retention. When IBM recognised the importance of workplace climate, which subsequently decides the success and failure of an organisation, the company was prompted to make changes and set best practices, which helped it to stay on top and become one of the world's major corporations. Enhancing employee performance must be the top priority on every organisation's agenda. Cultivating a positive workforce climate no longer remains an attractive option but should be accepted as something vital for business. Climate has a tangible effect on workers' motivation. A good working climate lifts an employee's confidence, faithfulness, and efficiency.

Karatepe (2015) postulated that organisational climate can directly cause positive or negative work outcomes. Positive work incentives, such as attractive work environment, good personnel policies, and provision of benefits, job structure, and compensation, make work interesting and create an enabling work environment that induces motivation amongst employees. In contrast,

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Dineen and Allen (2016) mentioned that negative work incentives, like those that make work uninteresting, unchallenging, and disappointing, lead to increased absenteeism, turnover, and accidents. As such, to prevent negative work outcomes, it is necessary to determine which factors within the organisational climate can lead to satisfaction among academics for them to continually be productive and content. Nonetheless, it is crucial to highlight that the researcher is not oblivious to the fact that factors such as clear lines of communication, sufficient reward system, and promotional opportunities could also encourage or discourage both positive and negative work outcomes, which if not effectively put in place results in turnover of the academics. Comparative studies of this nature provide the researcher with an avenue to determine variations in job satisfaction of academics and its effect on academic excellence.

Workers have developed a common belief regarding the degree to which their employer values their contributions and are concerned about their well-being. Supportive organisations are known to take pride in their staff, give them fair compensations, and look after their needs. In such situations, employees' investment of time and effort is rather secured. Therefore, workers could increase their investment by performing better (Stokes et al., 2013). Thus, the research gap, pertaining to the moderating role oragnisational climate among ODL staff must be filled.

## Methodology

### *Sampling Technique and Data Collection*

The data collection method employed a self-administered questionnaire. The unit of analysis was a selected distance learner who met the inclusion criteria: a) being an active student during the 2020–21 academic year; and b) being in at least the second year of a program. The objective of these criteria was to increase the chance that student engagement is significant to the individual and to enhance the accuracy of replies to questions about student satisfaction and learning outcomes. Before the study was conducted, the school in question granted permission for active student statistics to be collected. As of June 2022, the total of active distance learners were 4,225. Nonetheless, the 1st year students from the programs (1,077) were excluded, as they have not completed their learning experience as distance learners. Thus, students in 2nd, 3rd, 4th, and 5th year were the target population in his study which were 3,148. The population (n = 3,148) is based on the breakdown of the number of active students versus programs offered.

### *Population and Sample Size*

This research was designed to analyze distance-learning students from a public university in northern Malaysia. Hair et al.'s (2010) rule of thumb refers to the minimal sample size required to make data collection feasible. Sample sizes should be at least five times greater than the number of variable items being studied; nevertheless, a ratio of 10:1 may be more appropriate; for every variable item observed, there should be ten individuals. The present study included a total of 27 questions to measure each variable. Therefore, it was determined reasonable to expand this sample size by twenty-seven, yielding a total of 270 respondents.

### *Measures*

All of the items were chosen based on the satisfactory reliability of those that had been used in earlier studies. Using Moore's (1989) work, the three aspects of interaction were between learners and course materials, learners and instructors, and learners and other students. The participants were requested to rank the accuracy of the scale items using the three subscales.

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To accomplish this, a five-point Likert-type scale was employed, which ranges from 1 (strongly disagree) to 5 (strongly agree). In addition, this study used measures created by Trevino and Webster (1992) to quantify flow experience. On a 5-point Likert scale, 1 represents "strongly disagree" and 5 signifies "strongly agree." The five-measure approach established by Kuo et al. (2014) was used to gauge student satisfaction in the present study. On a 5-point Likert scale, 1 represents "strongly disagree" and 5 signifies "strongly agree."

### *Data Analysis*

Statistical Package for Social Science (SPSS) software version 24 approach was applied to analyze the research model. Utilizing SPSS statistical analysis, the data were screened for coding anomalies. Using the same program, descriptive statistics were created that displayed the frequency distribution, maximum, minimum, mean, standard deviation, and variance for each variable. Other techniques of analysis used were factor, reliability, multiple regression, and bivariate.

## Results

### *Respondent's Profile*

The respondents' demographic characteristics are detailed below. Male respondents accounted for 132 (41.6%) compared to the number of female respondents, 185 (58.4%). Around 52.1% of the participants were from 26 to 35 years old. Most of the respondents, 254 (80.1%), were majoring in management. A total of 218 (68.8%) of the respondents have good computer skills, and 187 (59.0%) of the respondents frequently used the e-learning portal. Online quizzes were the most popular e-learning activity experienced by the 141 respondents (44.5%). A total of 121 (3.2%) of the respondents spent between 11 and 15 hours on each online course per week.

**Table 4.1 Respondents' Demographic Profile**

| Demographic | Variable Category | Frequencies | Percentage (%) |
|---|---|---|---|
| **Gender** | Male | 132 | 41.6 |
| | Female | 185 | 58.4 |
| **Age** | 21–23 | 34 | 10.7 |
| | 26–35 | 165 | 52.1 |
| | 36–45 | 90 | 28.4 |
| | 46–55 | 26 | 8.2 |
| | Above 56 | 2 | 0.6 |
| **Major course** | Sciences | 23 | 7.3 |
| | Arts | 13 | 4.1 |
| | Social Sciences | 27 | 8.5 |
| | Management | 254 | 80.1 |
| **Level of Computer Skill** | Very Poor | 0 | 0.0 |
| | Poor | 0 | 0.0 |
| | Average | 34 | 10.7 |
| | Good | 218 | 68.8 |
| | Excellent | 65 | 20.5 |

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| | | | |
|---|---|---|---|
| **Frequency of using the E-Learning portal** | Never | 0 | 0.0 |
| | Seldom | 20 | 6.3 |
| | About Half the Time | 16 | 5.0 |
| | Usually, | 187 | 59.0 |
| | Always | 94 | 29.7 |
| **Experience with the E-learning activities** | Webinars | 22 | 6.94 |
| | PowerPoint slides | 29 | 9.15 |
| | Online Chat | 23 | 7.26 |
| | Online Quizzes | 141 | 44.48 |
| | Online Polling | 3 | 0.95 |
| | Blogs | 5 | 1.58 |
| | Video Conferencing | 0 | 0.00 |
| | Videos | 27 | 8.52 |
| | Discussion Forums | 31 | 9.78 |
| | Podcasts | 11 | 3.47 |
| | Wikis | 15 | 4.73 |
| | Games | 10 | 3.15 |
| **Hours spent online for each online course per week** | Less than 5 hours | 42 | 13.2 |
| | 6–10 hours | 51 | 16.1 |
| | 11–15 hours | 121 | 38.2 |
| | 16–20 hours | 78 | 24.6 |
| | Above 20 hours | 25 | 7.9 |

*Note:* N = 317

***Descriptive Statistics***

Descriptive analysis is the process of turning raw data into more easily understood and analyzed representations (Sekaran, 2011). Using descriptive statistics such as frequency, percentage, averages, and standard deviation, details such as gender, age, number of online courses taken, familiarity with the eLearning website, and level of computer skills were assessed. The number indicates the same reaction direction; the greater the mean, the better the measured variables' outcomes. Each study variable was constructed using a Likert-type scale that ranges from "strongly disagree" (1) to "strongly agree" (5). However, reverse coding was utilized for responses to five questions that were negatively expressed in psychological well-being tests (items 1–5), so if items were viewed more positively, this manifested in higher scores.

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**Table 4.2 Descriptive Statistics, Cronbach's Alpha, and Zero-Order Correlation of Interaction, Flow Experience, and Student Satisfaction**

| Constructs | No. of Items | Means | Standard Deviation | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|
| 1) Student Satisfaction | 5 | 4.09 | 0.58 | 0.910 | | | | |
| 2) Flow Experience | 5 | 3.74 | 0.63 | .127* | 0.637 | | | |
| 3) Learner-Content Interaction (L-CI) | 4 | 3.97 | 0.63 | .534** | .190** | 0.888 | | |
| 4) Learner-Instructor Interaction (L-II) | 6 | 3.92 | 0.65 | .517** | .137** | .823** | 0.876 | |
| 5) Learner-Learner Interaction (L-LI) | 8 | 3.58 | 0.71 | .162** | .766** | .185** | .123* | 0.915 |

*Note. N = 317; **p < 0.01; Diagonal entries indicate Cronbach's coefficients Alpha*

***Factor Analysis***

In this study, the basic structure of the data matrix was found, and factor analysis was used to look at how different variables relate to each other. A set of common dimensions, called factors, was developed. The quality and validity of data for the primary variables will be validated using varimax rotation. The items to be maintained in the scale were chosen based on eigenvalues greater than 1.00 and factor loading greater than 0.5. To measure sampling accuracy (MSA), the Kaiser-Meyer-Olkin (KMO) test was applied and must produce a minimum acceptable value of 0.5 (Hair et al., 1998). According to Hair et al. (1998), Bartlett's sphericity test must provide a substantial result in order to corroborate the factor analysis's assumptions. After factor analysis, the subsequent measures' dependability was evaluated. The internal consistency of each instrument item was examined using Cronbach's alpha.

***Factor Analysis for Interaction***

As indicated in Table 4.2, the KMO measure of sample adequacy was 0.888, showing appropriate intercorrelations, although Bartlett's sphericity test was statistically significant (Chi-squared = 4,471.004, p < 0.01). The eigenvalues were greater than 1, and 62.071% of the total variance was explained. According to design, all eighteen objects were put into three separate sections. The interaction between learners and course materials accounted for 28.96% of the variation in the original data, followed by interactions between learners and instructors and learners and other learners, which accounted for 17.087 and 16.017% of the variance in the original data, respectively. Table 4.2 displays the results of the factor analysis of interaction.

**Table 4.2 Results of Factor Analysis for Interaction**

| **Items** | **F1** | **F2** | **F3** |
|---|---|---|---|
| **Learner-Content Interaction (LCI)** | | | |
| 1. Online course materials helped me understand the class content. | .772 | | |
| 2. Online course materials stimulate my interest in this course. | .788 | | |
| 3. Online course materials help relate my personal experience to new concepts of new knowledge. | .855 | | |
| 4. It was easy for me to assess the online course materials. | .768 | | |

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| | | | |
|---|---|---|---|
| **Learner-Instructor Interaction (LII)** | | | |
| 1. I had numerous interactions with the instructor during the class. | .840 | | |
| 2. I ask the instructor my questions through different electronic means, such as email, discussion boards, instant messaging tools, etc. | .798 | | |
| 3. The instructor regularly posts some questions for students to discuss on the discussion board. | .779 | | |
| 4. The instructor replied to my questions in a timely fashion. | .796 | | |
| 5. I replied to messages from the instructor. | .683 | | |
| 6. I receive adequate feedback from my instructor when I require it. | .746 | | |
| **Learner-Learner Interaction (LLI)** | | | |
| 1. "Overall, I had numerous interactions related to the course content with fellow students." | | | .792 |
| 2. I got lots of feedback from my classmates. | | | .769 |
| 3. I communicated with my classmates about the course content through different electronic means, such as email, discussion boards, instant messaging tools, etc. | | | .810 |
| 4. I answered questions from my classmates through different electronic means, such as email, discussion boards, instant messaging tools, etc. | | | .707 |
| 5. I shared my thoughts or ideas about the lectures and their application with other students during this class. | | | .809 |
| 6. I comment on other students' thoughts and ideas. | | | .815 |
| 7. Group activities during class gave me the chance to interact with my classmates. | | | .566 |
| 8. Class projects led to interaction with my classmates. | | | .708 |
| Eigenvalues | 5.214 | 3.076 | 2.883 |
| % of Variance (62.071) | 28.967 | 17.087 | 16.017 |
| Kaiser-Meyer-Olkin | .888 | | |
| Bartlett's Test of Sphericity | 4,471.004 | | |

***Factor Analysis for Flow Experience***

As seen in Table 4.3, the KMO measure of sample adequacy was 0.816, indicating that the intercorrelations were adequate, although Bartlett's sphericity test was significant (Chi-squared = 902.326, $p < 0.01$). The eigenvalues were greater than 1, and 74.213% of the total variance was explained. The results of the factor analysis of Flow Experience are shown in Table 4.3.

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**Table 4.3 Results of Factor Analysis for Flow Experience**

| Items | F1 |
|---|---|
| **Flow Experience (FE)** | |
| 1. The e-learning courses allow me to control my own learning pace. | .869 |
| 2. I am not distracted by other online activities and am able to concentrate on learning activities. | .907 |
| 3. During e-learning, I find myself eager to press the NEXT button to learn what content or activity comes next. | .900 |
| 4. I like to attend e-learning courses. | .762 |
| Eigenvalues | 2.969 |
| % of Variance | 74.213 |
| Kaiser-Meyer-Olkin | .816 |
| Bartlett's Test of Sphericity | 902.326 |

***Factor Analysis Forstudent Satisfaction***

As seen in Table 4.4, the KMO measure of sample adequacy was 0.869, indicating that the intercorrelations were adequate, although Bartlett's sphericity test was significant (Chi-squared = 1,131.396, $p < 0.01$). The eigenvalues were greater than 1, and 71.307% of the total variance was explained. Table 4.4 displays the findings of an analysis of student satisfaction.

**Table 4.4 Results of Factor Analysis for Student Satisfaction**

| Items | F1 |
|---|---|
| **Student Satisfaction (SS)** | |
| 1. Overall, I am satisfied with this class. | .836 |
| 2. This course contributed to my educational development. | .860 |
| 3. This course contributed to my professional development. | .818 |
| 4. I am satisfied with the level of interaction that happened in this course. | .875 |
| 5. In the future, I would be willing to take a fully online course again. | .832 |
| Eigenvalues | 3.565 |
| % of Variance | 71.307 |
| Kaiser-Meyer-Olkin | .869 |
| Bartlett's Test of Sphericity | 1,131.396 |

***Hypothesis Testing Using Multiple Regression Analysis***

Hypotheses were tested using multiple regression analysis.

***The Relationship between Interaction and Flow Experience***

By applying the following three hypotheses, the links between interaction (between learners and course materials, instructors, and other learners) and flow experience were investigated:

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H1: Learner-content interaction has a significant influence on flow experience.
H2: Learner-instructor interaction has a significant influence on flow experience.
H3: Learner-learner interaction has a significant influence on flow experience.

Results of the three hypotheses tested show that the beta value reported for Learner-Content Interaction is 0.109, Learner-Instructor Interaction is -0.023, and Learner-Learner Interaction is 0.769. In addition, the $R^2$ score is 0.686, with an Adjusted $R^2$ of 0.684. The F value is given as 279.225. The results show there is a negative connection between interaction (Learner-Content, Learner-Instructor, and Learner-Learner) and the Flow Experience. Therefore, H1, H2, and H3 are not supported (see Table 4.6).

**Table 4.6 Regression Analysis for Interaction and Flow Experience**

| **Variables** | **Beta** | |
|---|---|---|
| Learner-Content Interaction (LCI) | 0.109 | |
| Learner-Instructor Interaction (LII) | -0.023 | |
| Learner-Learner Interaction (LLI) | 0.769 | |
| $R^2$ | | 0.686 |
| Adj $R^2$ | | 0.684 |
| F | | 279.225 |

*Note*: N = 136, ****p* < .01 (2.33), ***p* <.05 (1.645), **p* < .1 (1.28) (based on one-tailed test)

***The Relationship between Interaction and Student Satisfaction***

By applying the following three hypotheses, the correlations between interaction (between learners and course materials, instructors, and other learners) and student satisfaction were investigated:

H4: Learner-content interaction has a significant influence on student satisfaction.
H5: Learner-instructor interaction has a significant influence on student satisfaction.
H6: Learner-learner interaction has a significant influence on student satisfaction.

Results of the three hypotheses tested show that the beta value reported for Learner-Content Interaction is 1.342, Learner-Instructor Interaction is 2.757, and Learner-Learner Interaction is 1.908. In addition, the data demonstrate an $R^2$ value of 0.591 and an Adjusted $R^2$ value of 0.588. The value of F was determined to be 184.379. These outcomes infer that interaction (between students and course materials, instructors, and other learners) and student satisfaction are positively correlated. Therefore, H5, H6, and H7 are supported (see Table 4.7).

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**Table 4.7 Regression Analysis for Interaction and Student Satisfaction**

| Variables | Beta | |
|---|---|---|
| Learner-Content Interaction (LCI) | 1.342* | |
| Learner-Instructor Interaction (LII) | 2.757*** | |
| Learner-Learner Interaction (LLI) | 1.908** | |
| $R^2$ | | 0.591 |
| Adj $R^2$ | | 0.588 |
| F | | 184.379 |

*Note*: N = 136, ***$p$ < .01 (2.33), **$p$ <.05 (1.645), *$p$ < .1 (1.28) (based on one-tailed test)

***The Relationship between Flow Experience and Student Satisfaction***

One hypothesis was postulated for the relationship between flow experience and student satisfaction. The following hypothesis states that:

H7: Flow experience has a significant influence on student satisfaction.

According to the hypothesis test findings, the beta value is 2.692. In addition, the R2 value is 0.015, with an Adjusted R2 of 0.13. The F value is stated to be 5.950. The findings indicate a favorable association between Flow Experience and Student Satisfaction, as well as a substantial relationship between Flow Experience and Student Satisfaction. Therefore, H7 is supported (see Table 4.8).

**Table 4.8 Regression Analysis for Flow Experience and Student Satisfaction**

| Variable | $R^2$ | Adj $R^2$ | Beta | F |
|---|---|---|---|---|
| Flow Experience and Student Satisfaction | 0.015 | 0.013 | 2.692*** | 5.950 |

*Note*: N = 136, ***$p$ < .01 (2.33), **$p$ <.05 (1.645), *$p$ < .1 (1.28) (based on one-tailed test)

***The Mediating Effect of Flow Experience between and Interaction and Student Satisfaction***

The influence of interaction (between students and course materials, instructors, and other learners) on student satisfaction was investigated using the three following hypotheses:

H8: Flow experience mediates the relationship between learner-content interaction and student satisfaction.
H9: Flow experience mediates the relationship between learner-instructor interaction and student satisfaction.
H10: Flow experience mediates the relationship between learner-learner interaction and student satisfaction.

According to the hypothesis test findings, the beta value is 2.692. In addition, the R2 value is 0.015, with an Adjusted R2 of 0.13. The F value is stated to be 5.950. The findings indicate a favorable association between Flow Experience and Student Satisfaction, as well as a substantial relationship between Flow Experience and Student Satisfaction. Therefore, H7 is supported (see Table 4.8).

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**Table 4.8 Hierarchical Multiple Regression Analysis of Flow Experience As A Mediator in the Relationships between Independent Variables and Student Satisfaction (Step 3 & Step 4)**

| Variables | Step 1 (IV to DV) | Step 2 (IV to MV) | Step 3 (MV to DV) | Step 4 (IV, MV to DV) |
|---|---|---|---|---|
| | Std Beta | Std Beta | Std Beta | Std Beta |
| Flow Experience | | | 0.871*** | 0.118*** |
| Interaction | 0.171*** | 0.143* | - | 0.375*** |
| Student Satisfaction | - | - | - | 0.375*** |
| $R^2$ | 0.544 | 0.604 | 0.477 | 0.579 |
| Adjusted $R^2$ | 0.543 | 0.603 | 0.476 | 0.577 |
| $R^2$ Change | 0.544 | 0.604 | 0.477 | 0.579 |
| F value | 575.217 | 736.410 | 440.329 | 330.773 |
| F Change | 575.217*** | 736.410*** | 440.329*** | 330.773*** |
| Durbin-Watson | 2.168 | 1.658 | 1.790 | 2.098 |
| Dependent variable | Student Satisfaction | Student Satisfaction | Student Satisfaction | Student Satisfaction |

****p* < .01, ***p* <.05, **p* < .1
IV = Independent variables, MV = Mediating variable, DV = Dependent variable

The resultant beta values for each tested hypothesis are provided in Table 4.8. Following the inclusion of flow experience as the mediating construct, the correlations between the interactions between learners and course materials, learners and instructors, and learners and other learners (as the independent variables) on the one hand and the satisfaction of student appliances on the other hand were lowered to the extent that they differed significantly from zero (0); full mediation was then supported. Therefore, H8, H9, and H10 are supported.

**Discussion**

Contrary to the postulated hypothesis, the present study demonstrated that learner-instructor interaction had no significant influence on flow experience. This finding backs up the findings of Widjaja and Widjaja (2022) that found no significant association between the influence of features of the interaction and flow experience on rated ease and intrinsic motivation of the used e-learning system and possible use intentions. It was also emphasized that online learning engagement and flow experiences may not be predicted by learner-instructor interaction (Wang et al., 2022). Furthermore, it is supported by previous research that during learner interactions, the instructor makes an effort to inspire learners and pique their interest in the course materials (Gu et al., 2022). This discovery, however, contradicts previous research results since various

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academics and instructors have established that a variety of effects, including flow experience components such as motivation and attitudes, affect online learning (Dwivedi et al., 2019).

Globally, academic organizations have embraced online learning because it gives learners access to omnipresent learning experiences and makes educational operations more learner-centered. Indeed, a variety of educationally-related factors for boosting the efficiency of distance e-learning have been investigated, including aspects pertaining to learners and instructors as a reference, which focuses on the flow experience as well as interaction between instructors and learners. On top of that, internet technology enables more extensive engagement than the educational approach that takes place in conventional courses, although the gap is substantially greater. Therefore, it is reasonable to assume that learner-instructor interaction doesn't need to influence the flow experience. By engaging in the online learning setting, learners may believe that the courses are adequate to keep them up to date. As a result, this study found that learner-instructor interaction did not have a significant influence on the flow experience. The present study's findings revealed that learner-learner interaction had no significant influence on the flow experience. One potential reason for this result is the growth of online learning technology, which allows education to facilitate remote learning.

According to this study, learner-instructor interaction significantly affected student satisfaction. The positive link between learner-instructor interaction and Student Satisfaction supports the idea that those learners that have interacted with their instructor tend to meet their learning satisfaction. From this finding, it is justified to say that learner-instructor interaction with Malaysian learners has a significant influence on maintaining student satisfaction, which has a vital role in the learner's education program. Since instructor presence may influence learner-instructor interaction, boosting the learning process, it is considered to be a significant component in determining students' satisfaction (Razali et al., 2020). This is following Ali's (2020) findings, which found that comprehensive online distance education requires three sorts of interactions, which include learner-to-learner, learner-to-instructor, and learner-to-content. The study's findings revealed that the characteristics of learner-learner interaction had a beneficial influence on student satisfaction.

## Conclusion

The present study concentrated on examining the effect of interaction on student satisfaction in Malaysia, specifically by using flow as a mediating component. This study supported the premise that interaction plays a critical role in student satisfaction via empirical data analysis; this will result in improved learning outcomes as well as a reduction in the number of dropouts among learners. The present study also provided empirical backing for the applicability of the flow aspect to student satisfaction in Malaysia. The evidence shows that the move from physically direct education to online platforms, as well as constructed approaches to suit various scenarios, is what remote distance education is all about (Hodges et al., 2020; Morgan, 2020). Online distance learning necessitates a meticulous learning environment as well as consideration of various rules (Branch & Dousay, 2015). This strategy will raise the learners' sense of satisfaction and align their objectives and expectations with those of the organization and the government.

Moreover, learners presently anticipate much greater educational performance from various perspectives in the teaching and learning context. One example is by using digital technologies to enhance service offerings and boost learners' learning capacity (Routabi & Bennani, 2022).

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The quantitative findings revealed that learners' interactions with each other, instructors and the course materials have a favorable impact on their satisfaction. Learner satisfaction has also been revealed to be significantly influenced by the flow. It is strongly advised that governmental human resource agencies continue to cultivate and invest in human resources to establish online platforms. Almost always, these platforms serve as an additional training resource. Nevertheless, the move from conventional to online training should equip learners with the capacity to be dynamic and adaptable, as well as possibilities for autonomous and imaginative creative work, as well as inspire them to take on challenges and try new initiatives.

As a result, learners' self-efficacy and capacities will improve (AlGhamdi, 2022). Distance learning technology should be adequate to ensure learner achievement (Aldhahi, 2022). Most colleges are committed to having a large team of professionals to facilitate the distance learning environment and create an exclusive preparatory program for learners and instructors. Ultimately, during online courses, interaction and engagement via technology, not only among instructors and learners but also between other learners, have a substantial influence on student satisfaction (Aldhahi, 2022). According to researchers, the effectiveness of electronic-based educational courses influences learners' learning experiences and decides whether or not they have favorable learning possibilities (Alqurashi 2019). As hypothesized, interaction, including learner-content interaction, learner-learner interaction, and learner-instructor interaction, was discovered to be associated positively with student satisfaction incorporated with the flow, which was found to also mediate student satisfaction.

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