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EXPLORING EDUCATION IN THE DIGITAL AGE: INNOVATIONS, INTERSECTIONS AND INSIGHTS

PREFACE

Dear esteemed readers and contributors,

It is with great pleasure and excitement that I extend a warm welcome to you all to this special edition of our journal, dedicated to exploring the diverse and dynamic themes shaping the landscape of education in the digital era. As we embark on this journey of discovery, each theme serves as a guiding beacon, illuminating the innovative intersections of technology and pedagogy.

Our first theme, Teaching based on Artificial Intelligence (AI), Machine Learning (ML), and the Internet of Things (IoT), sets the stage for our exploration by delving into the transformative potential of intelligent technologies in education. From personalized learning experiences to predictive analytics, AI, ML, and IoT hold the promise of revolutionizing traditional teaching methods and unlocking new pathways to knowledge acquisition.

Theme 2 invites us to immerse ourselves in the realm of 360 Learning, Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). Here, we witness the fusion of physical and digital worlds, as learners embark on immersive journeys that transcend the confines of the traditional classroom. Through experiential learning and interactive simulations, VR, AR, and MR technologies redefine the boundaries of education, offering unprecedented opportunities for engagement and exploration.

In Theme 3, we explore the power of Collaborative Teaching, Global Learning, and innovative practices such as Gamification, Maker-Space, and Maker Lab initiatives. This theme underscores the importance of collaboration, cultural exchange, and hands-on experimentation in fostering creativity, critical thinking, and problem-solving skills among learners worldwide.

Theme 4 sheds light on the paradigm shift towards Open and Distance Learning (ODL), Self-Instructional Materials (SIM), and the utilization of Big Data Analytics in Learning. Here, we witness the democratization of education, as learners gain access to high-quality resources and personalized learning experiences irrespective of geographical constraints. Big Data analytics further enhance the educational landscape by providing insights into learner behavior and preferences, enabling educators to tailor instruction to individual needs.

In Theme 5, we explore the evolving role of Social Media Learning as a catalyst for knowledge dissemination, collaboration, and community building. From online forums to multimedia platforms, social media offers a dynamic space for peer-to-peer learning, digital literacy development, and the cultivation of virtual learning communities.

Theme 6 invites us to embrace Design Thinking for new Learning Delivery, emphasizing the importance of user- centered design principles in creating innovative and inclusive learning experiences. Through empathetic design, educators can reimagine learning environments that foster creativity, adaptability, and lifelong learning skills.

In Theme 7, we delve into Andragogy in technology-based learning, Instructional Design, and Best Practices in e-learning. This theme highlights the importance of learner-centered approaches, effective instructional design strategies, and the dissemination of evidence-based practices to optimize learning outcomes in the digital age.

Finally, Theme 8 explores the Development of e-learning systems, materials, and mobile technologies, including the emergence of MOOC-based mobile learning materials. Here, we witness the evolution of educational technologies, as mobile devices and online platforms redefine the boundaries of access and engagement in education.

As we navigate through these diverse themes, let us embrace the spirit of inquiry, collaboration, and innovation that defines our scholarly community. I extend my deepest gratitude to all the contributors who have enriched this journal with their insights and expertise. May this edition inspire new ideas, spark fruitful discussions, and contribute to the ongoing dialogue surrounding the future of education.

Thank you for your dedication and commitment to advancing the frontiers of knowledge in the field of education.

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Guest Editors

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Leading the Way: Self-Directed Learning and Leadership in University Student-Leaders

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ABSTRACT
This research measures the relationship between students' leadership styles (task-oriented and relationship-oriented) and self-directed learning among university student-leaders. The study also investigates the connection between leadership styles and academic performance (CGPA) among these student-leaders. A cross-sectional study design was employed, and a convenience sampling

technique was used to select 93 participants from Universiti Teknologi MARA (UiTM) Sarawak Brach, Samarahan Campus, who were enrolled in leadership modules named Modul Kepimpinan Ikon, Modul Kepimpinan Professional, and Modul Kepimpinan Survival Bangsa. The participants completed two established questionnaires: Northhouse's Leadership Questionnaire and an instrument measuring self-directed learning. The results indicate that both task-oriented and relationship-oriented leadership styles are positively correlated with self-directed learning among university student-leaders. Both leadership styles have no significant relationship with academic performance. Regarding gender differences, the study found no significant difference in task-oriented leadership between male and female student-leaders. However, there was a significant difference in relationship-oriented leadership between male and female participants, with female student-leaders exhibiting higher relationship-oriented leadership behaviors. In conclusion, this study highlights the importance of leadership education and development among university students, as effective leadership behaviors are positively associated with self-directed learning. By fostering both task-oriented and relationship-oriented leadership skills, universities can better prepare their students for the challenges of the real working world and contribute to their personal and professional growth.

Keywords: academic achievement; leadership; self-directed learning; student leader; university students

INTRODUCTION

Leadership assumes a significant role in many facets of a student's life. Students undergo many phases in their journey of career growth, during which the acquisition of leadership qualities becomes essential. In modern society, students encounter various obstacles related to their career prospects, opportunities for employment, and the struggle arising from the mismatch of idealistic goals with practical benefits. The acquisition of leadership skills is crucial for individuals to effectively confront challenges, handle problems, and evaluate their career direction. Leadership education and development are essential across all levels of society, encompassing both the younger generation and high-ranking corporate executives (Anagnostakis, 2022). Given this demand, institutions of higher education are increasingly viewed as ideal platforms for leaders who can create positive social change (Mwita et al., 2023).

Universities' mission and vision statements are likely to focus on leadership education and training (Devies & Guthrie, 2022). Universiti Teknologi MARA (UiTM) has implemented a module on leadership in order to polish the students' leadership skills and ensure they are prepared for the real working world upon graduation. This module is named Modul Kepimpinan Pewaris Bangsa (MKPB) and was established in 2015 under the organization of Institut Kepimpinan Pelajar, UiTM. The module involves student-leaders from various faculties and societies, gather to share ideas and knowledge in becoming great leaders. Many activities are included in this module, for example, fieldtrips, seminars, paperwork proposal presentations, group work, and outdoor activities.

As important as the leadership style to be developed, learning independently is also crucial. It is called self-directed learning. Self-directed learning is the proactive engagement of individuals, either independently or with external assistance, in identifying their own needs for learning, developing suitable strategies for learning, selecting and employing appropriate methods for learning, and assessing the outcomes of their accomplishments in learning (Knowles, 1975). The Staged Self-Directed Learning (SSDL) Model (Grow, 1991) will be the theoretical model of this study. The author claims that learners move through a series of stages that are each designated by a steady growth in self-direction. The presence of a teacher or instructor can either facilitate or impede a student's progress in light of heightened self-directedness. The Self-Directed Learning Readiness (SSDL) model employs a four-stage framework that explains the degree of self-direction exhibited by a student. The first stage (S1) encompasses individuals who exhibit a limited degree of self-direction. Learners often require the guidance of an authoritative figure, typically a teacher, who can provide them with clear and specific instructions regarding the tasks at hand, the methods to be employed, and the appropriate timing for their completion. In the second stage (S2), learners exhibit a keen interest and derive satisfaction from engaging and thought-provoking lectures. In the third stage of learning, commonly referred to as S3, learners are actively engaged and require a facilitative approach from their instructor. In the final stage, known as stage four (S4), students exhibit self-directed learning tendencies and thrive through engaging in internships, conducting dissertations, pursuing solo work, or participating in self-directed study groups. There is a consensus that teachers have the ability to instruct many levels of students within a single educational environment. However, it is important to possess a comprehensive understanding of each level in order to effectively integrate all students into the learning process of every lesson.

There are numerous advantages associated with students' engagement in extracurricular activities beyond their prescribed academic curriculum. Participation in university clubs or organisations enhances students' academic experiences and has the potential to contribute to notable academic accomplishments. The individual's capacity for leadership development has exhibited growth, hence enhancing their ability to effectively navigate and manage challenges (Khan et al., 2020). University has the opportunity to influence the students as their life stage, is away from home and in a transition in becoming grown adults. Higher education should acknowledge the demanding challenges of leadership on ways to produce more prominent leaders among students. Due to this, UiTM has developed the MKPB, one of the ways to polish and develop university students' leadership. Therefore, this study aims to examine the relationship between students' leadership styles and self-directed learning among university student-leaders.

The impact of leadership on academic performance is no longer presented as a direct influence, but rather acknowledged as an indirect factor that shapes instructional organisation and culture (Nabella et al., 2022). In this perspective, leadership plays a pivotal role in influencing the broader educational environment within institutions. To assess the students' level of self-directed learning, researchers have extensively utilized this measure. Self-directed learning is particularly critical for adult students who transition through various stages of their education, a process influenced by factors such as subject knowledge, psychological maturity, and professional ambitions, as suggested by Brandt (2020). This underscores the importance of fostering self-directed learning skills in students of all ages.

The potential for recruiting and developing leaders through the curriculum and co-curricular activities is abundant (Tucci et al., 2019). Universities have implemented formal leadership programs with the objective of enhancing and nurturing the knowledge, skills, and values of their students. These programs play a significant role in shaping future leaders. However, the longevity and sustainability of students' leadership skills, as cultivated through various university programs, remain a topic of debate and inquiry (Noori, 2021). Consequently, the promotion of self-directed learning is paramount to ensure that students do not become overly dependent on teachers or instructors as they transition into their careers later in life. Self-directed learning empowers them to continue their educational and leadership development independently, even beyond their time at the university.

Therefore, the study has three primary objectives. Firstly, it aims to explore the relationship between students' leadership styles, with a specific focus on task-oriented and relationship-oriented leadership, and self-directed learning. Secondly, it seeks to assess how these leadership styles correlate with academic performance, quantified by Cumulative Grade Point Average (CGPA). Lastly, the research aims to investigate potential gender-based disparities in both leadership styles and self-directed learning within the context of university student-leaders.

METHODOLOGY

Study design and participants

This study was descriptive research employing a cross-sectional study design. The population of this study were university students from Universiti Teknologi MARA Sarawak. A sample of student-leaders was recruited as participants by using a convenience sampling technique who attended the three modules in the semester, March 2021–August 2021 (N = 93). The students volunteered to answer our questionnaire and became the respondents.

Measures

Northouse's (2001) leadership questionnaire was employed to assess the leadership styles of the participants. This instrument consists of 20 items that evaluate two leadership orientations: task and relationship. Each item was rated on a 5-point Likert scale, with 1 indicating "Never," 2 indicating "Seldom," 3 indicating "Occasionally," 4 indicating "Often," and 5 indicating "Always." The odd-numbered items pertain to task-oriented leadership, while the even-numbered items focus on relationship-oriented leadership. The scores for odd and even items were summed separately. The resulting scores were categorized as follows: very high (45-50), high (40-44), moderately high (35-39), moderately low (30-34), low (25-29), and very low (10-24). This questionnaire has been validated in previous studies. In the current study, the internal consistency, measured by Cronbach's alpha, was α = 0.93.

The students' level of self-directed learning was assessed using a well-established instrument. This tool consists of eight items, each rated on a 4-point Likert scale: 1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree. The instrument has demonstrated high reliability, with a Cronbach's alpha of .89. In this study, the Cronbach's alpha was α = 0.83. The

participants' sociodemographic information was sought by including them in the first section of the questionnaire: Gender, age, backgrounds, faculty, level of study, club participation, position in the club, and academic performance (CGPA).

Statistical analysis

The data were analyzed using the Statistical Package for Social Science (SPSS) version 25. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were presented. Independent sample t-tests and one-way ANOVA were used to compare participants' characteristics with the variables measured. Pearson correlation was employed to assess the relationships between variables. Statistical significance was set at $p < .05$.

RESULTS

The present study adopted a cross-sectional design where the data collection was conducted in 2021 in which the online distance learning was held at all universities in Malaysia. A total of 93 students completed the online form. Notably, the majority of participants were female (80.6%), predominantly falling in the 21–24 age group (64.5%), and belonging to the Malay ethnic background (50.5%). Study levels of the participants were diploma (41.9%) and bachelor's degree (58.1%). In societal roles, most participants served as Committee Members (74.2%), while academic performance ranged from 2.50 to 4.00 CGPA. The mean scores of task-oriented leadership, relationship-oriented leadership, and self-directed learning were 43.48 ± 5.97, 39.14 ± 5.98, and 3.86 ± 0.65, respectively (Table 1).

There was a statistically significant difference in relationship-oriented leadership between males (40.89 ± 6.91) and females (44.11 ± 5.59) ($p < .05$). However, when examining other characteristics such as age group, ethnicity background, study level, roles in society, and CGPA, no statistically significant differences were observed ($p > .05$) in either task-oriented or relationship-oriented leadership styles. Regarding self-directed learning, a significant difference emerged based on age groups. Participants aged 18–20 years old (4.03 ± 0.49) displayed a significantly higher mean score for self-directed learning compared to those in the 21–24 years old category (3.64 ± 0.63) ($p < .05$) (Table 2).

Table 3 presents the relationships between leadership styles, namely task-oriented leadership and relationship-oriented leadership, as well as self-directed learning and academic performance, all assessed using Pearson correlation coefficients (r). A strong positive correlation was observed between task-oriented leadership and relationship-oriented leadership ($r = .684$, $p < .05$). Similarly, self-directed learning showed a positive correlation with both task-oriented leadership ($r = .529$, $p < .05$) and relationship-oriented leadership ($r = .467$, $p < .05$). However, the academic performance did not demonstrate a significant relationship with both leadership styles ($p > .05$).

Table 1. Descriptive Statistics of the Participants ($N = 93$)

Characteristics	***n***	***%***
Gender		
Male	18	19.4
Female	75	80.6
Age group		
18–20 years old	33	35.5
21–24 years old	60	64.5
Ethnicity background		
Malay	47	50.5
Bumiputera Sarawak	32	34.4
Bumiputera Sabah	13	14.0
Others	1	1.1
Study level		
Diploma	39	41.9
Degree	54	58.1
Roles in society		
President	13	14.0
Secretary	6	6.5
Treasurer	5	5.4
Committee member	69	74.2
Academic performance (CGPA)		
2.50 – 3.00	8	8.6
3.01–3.49	46	49.5
3.50–4.00	39	41.9
Leadership styles	*M* ± *SD* (min.-max.)	
Task-oriented	39.14 ± 5.98 (24–50)	
Relationship-oriented	43.48 ± 5.96 (28–50)	
Self-directed learning	3.86 ± 0.65 (2.38 – 5.00)	

Table 2. Task-oriented, Relationship-oriented and Self-directed learning by characteristics

Variables	**Task-oriented**		**Relationship-oriented**		**Self-directed learning**	
	M* ± *SD	***p***	***M* ± *SD***	***p***	***M* ± *SD***	***p***
Gender						
Male	39.56 ± 6.33	0.744	40.89 ± 6.91	0.04*	3.85 ± 0.61	0.54
Female	39.04 ± 5.93		44.11 ± 5.59		3.76 ± 0.62	
Age group						
18–20 years old	40.15 ± 5.78	0.23	44.15 ± 5.19	0.43	4.03 ± 0.49	0.03*
21–24 years old	38.58 ± 6.1		43.11 ± 6.36		3.64 ± 0.63	
Ethnicity background						
Malay	38.75 ±6.43	.789	43.66 ± 6.22	.831	3.85 ± 0.64	.367
Bumiputera Sarawak	39.09 ± 5.58		42.78 ± 6.39		3.77 ± 0.62	
Bumiputera Sabah	40.46 ± 5.63		44.54 ± 4.01		4.06 ± 0.75	
Others	42.00		44.00		4.63	
Study level						

Diploma	40.54 ± 5.03	0.06	44.56 ± 5.03	.139	4.00 ± 0.61	0.06
Degree	38.13 5.85		42.70 ± 6.49		3.75 ± 0.66	
Roles in society						
President	42.38 ± 5.75	0.245	45.48 ± 5.17	0.267	4.15 ± 0.69	0.602
Secretary	40.17 ± 3.54		45.17 ± 5.60		3.85 ± 0.49	
Treasurer	39.00 ± 7.52		45.20 ± 4.97		4.00 ± 0.32	
Committee member	38.45 ± 5.97		42.86		3.80 ± 0.67	
CGPA						
2.50–3.00	40.45 ± 2.82	0.25	45.00 ± 5.42	.27	4.03 ± 0.64	0.60
3.01–3.49	38.09 ± 5.32		42.48 ± 6.32		3.89 ± 0.60	
3.50–4.00	40.15 ± 6.99		44.36 ± 5.57		3.79 ± 0.72	

*$p < .05$, analysed using independent sample t-test

Table 3. Relationships between leadership styles; task leadership style and relationship leadership style and self-directed learning and academic performance

Variables	**Task-oriented leadership**	**Relationship-oriented leadership**	**Self-directed learning**
		Pearson correlation *(r)*	
Leadership styles			
Task-oriented leadership	-	.684*	.529*
Relationship-oriented leadership	.684*	-	.467*
Self-directed learning	.529*	.467*	-
Academic performance	.088	.063	.123

* $p < .05$

DISCUSSION

This study aims to examine the relationship between leadership styles—task-oriented and relationship-oriented—and self-directed learning, comparing these relationships across demographic factors among university student-leaders. Overall, the leadership styles observed in the study ranged from moderately high (task-oriented leadership) to high (relationship-oriented leadership). This suggests that student-leaders possess a sufficient level of leadership traits. Despite the limited availability of society activities and leadership programs during the timeframe of data collection, the high leadership styles exhibited by our participants hold promise for the quality of student-leaders we have.

However, when looking at the mean score for self-directed learning, it showed a moderate level. It is important to consider that the shift to online distance learning (ODL) due to the COVID-19 pandemic might have influenced these findings. The majority of learning during this period occurred independently at home, which significantly differed from the typical university learning environment prior to the outbreak. Studies have indicated that this shift caused stress and required significant adaptation among university students (Masha'al et al., 2020; Isa et al., 2021).

The study revealed a significant difference in relationship-oriented leadership between males and females, with females displaying higher scores in this leadership styles. This gender-based difference suggests that gender may influence leadership inclinations, with females tending to lean more toward relationship-oriented leadership styles. Relationship-oriented leadership styles are concerned with the interpersonal dynamics, well-being, and job satisfaction of team members (Bass & Stogdill, 1990). This explains why female leaders are seen as emphasizing these aspects more than their male counterparts. This type of leadership, also known as people-oriented leadership, focuses on supporting and motivating teams or work groups and the relationships therein, which is very synonymous with females who exhibit more caring and empathetic behavior. On the other hand, even though task-oriented has been reported to be more prevalent among males than females (Qiu & Dooley, 2018), it was similarly distributed between the genders.

The study also identified a significant difference in self-directed learning based on age groups. Participants aged 18-20 years old exhibited significantly higher scores in self-directed learning compared to those in the 21-24 age category. This finding underscores the idea that younger age groups of students may be more inclined toward self-directed learning, possibly due to their familiarity with digital tools and platforms commonly used in online distance education. It is noted that, the ODL has been widely used for almost one year during the data collection; since 2020 (Su & Guo, 2021), which might influence these findings.

A strong positive correlation was observed between task-oriented and relationship-oriented leadership styles, indicating that students who excelled in one style often demonstrated proficiency in the other as well. This finding reveals a valuable insight: the study's sample of student leaders possesses the traits necessary to ensure that delegated tasks will be accomplished and to foster a positive and collaborative environment in their society (Muthoni et al., 2018). Additionally, self-directed learning exhibited positive correlations with both task-oriented and relationship-oriented leadership styles. The higher the students' self-directed learning, the more proficient they are in task-oriented and relationship-oriented leadership styles. These are good indicators of great student leaders who have the potential to become outstanding future leaders in their respective fields one day.

However, the study found that academic performance, as measured by CGPA, did not demonstrate a significant relationship with either leadership style. This suggests that while leadership skills and self-directed learning may hold value for personal development, they may not directly impact the academic performance of student-leaders. In a study conducted by Park and Kim (2023), it was observed that students with the highest academic achievement exhibited the highest levels of self-directed learning. It is important to note, however, that the said study focused on undergraduate students and not specifically on student-leaders. Consequently, it can be concluded that among this study participants, their leadership skills and self-directed learning are not significantly influenced by their academic performance. Furthermore, it is worth mentioning that the majority of the study's participants achieved a CGPA between 3.01 and 4.0, which falls within the upper class category. It is important to note that to qualify as student-leaders and hold positions within their respective societies, one of the requirements is to maintain a CGPA of more than 3.01. This factor helps explain the findings.

The COVID-19 pandemic has significantly disrupted the learning environment for university students, leading to heightened disorientation and stress. Consequently, students have been compelled to dedicate the whole day to engaging in online classes, which include viewing videos, listening to audio, and completing other assignments. The consequence of the teaching-learning environment on the acquisition of competencies during the learning process has been found to be a potential obstruction, resulting in a disappointing lack of self-directed learning among students.

CONCLUSION

This study examined the relationships between leadership styles, self-directed learning, and academic performance in university student-leaders. It was found that student-leaders possess moderate to high leadership styles, with females showing a preference for relationship-oriented leadership. Younger students tended to have higher levels of self-directed learning, possibly due to their familiarity with online tools. A positive relationship between leadership styles and self-directed learning, suggesting that students excelling in one area often do well in the other. However, leadership styles or self-directed learning did not appear to have significant effects on academic performance. The COVID-19 pandemic disrupted traditional learning, impacting self-directed learning negatively. This research offers insights for educators, emphasizing the need for tailored leadership and self-directed learning programs, taking gender and age into account.

IMPLICATIONS OF THE STUDY

The findings of this study have several implications for educators and universities. Understanding the interplay between leadership styles, self-directed learning, and academic performance can inform the development of more effective educational strategies. It highlights the importance of tailoring leadership and self-directed learning programs to cater to the diverse needs of students, taking into consideration factors such as gender and age.

Future research could root deeper into the interactions among these variables, exploring how they influence long-term personal growth and career development. Additionally, studies could investigate the effectiveness of leadership programs, such as MKPB at UiTM, in fostering leadership skills and self-directed learning among students. This would help universities refine their approaches to leadership education and better prepare students for the challenges they will encounter in their careers and personal lives.

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Conflict of Interest

The authors affirm that there is no conflict of interest in this article.

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Authors' Contributions

Author 1 and 2 prepared the literature review, performed the statistical analysis, and interpreted the results. Author 3 and 4 were responsible for handling the field work and supervising the entire article.

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