
The opinions on factors affecting the use of web-based learning by quality durian farmers in Rayong Province, Thailand

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Abstract The majority of farmers who used the web-based learning system were male, aged 38.45 years, had lower than a bachelor's degree, cultivated durian planting areas of more than five rai, had more than five years of experience in durian planting, accessed a learning channel on durian production through an application, frequently accessed media less than five times per day, and spent an average of less than five hours per day accessing online media. Farmers' opinions indicated that benefits and applications had the highest impact on web-based learning adoption ($\bar{x} = 4.56$), followed by content ($\bar{x} = 4.41$), design ($\bar{x} = 4.40$), and efficiency ($\bar{x} = 4.26$). Multiple regression analysis revealed that media access frequency ($\beta = 0.29$) and durian growing experience ($\beta = 0.20$) significantly predicted farmers' perceptions of design factors. These same variables strongly influenced content factors, with access frequency ($\beta = 1.60$) and growing experience ($\beta = 0.78$) as significant predictors. For usability factors, only education level emerged as significant ($\beta = 0.18$), while no demographic characteristics significantly influenced farmers' perceptions of WBL benefits and applications.

Keywords: Web-based learning, Durian digital learning platform, Farmers

Introduction

Social media has become a crucial tool for rapid information dissemination and retrieval, significantly benefiting farmers who can access accurate information. As Thailand enters a digital era, the agricultural sector is adopting modern technologies for information management—known as precision agriculture—to enhance crop production efficiency (Atchara, 2021). However, Thai farmers face challenges such as limited knowledge of production-enhancing technologies, inadequate planning and management skills, insufficient group management capabilities, and a lack of marketing and distribution channel expertise. These factors often result in farmers selling products at suboptimal prices, reducing their income (Digital Economy Promotion Agency, 2017).

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The transition from traditional to modern agriculture emphasises management and technology to optimise production using economic resources. The Thai Ministry of Agriculture and Cooperatives has initiated projects promoting information technology in agriculture through mobile applications for efficient farm management (Ministry of Agriculture and Cooperatives, 2021). Research by Chiang Mai University demonstrates the positive impact of technology on farmers in terms of production and marketing (Wirach, 2020). In the private sector, agritech solutions like the “Farmsmart” application offer farm management and online marketing services to a new generation of farmers (Digital Economy Promotion Agency, 2024). Farmers must leverage public and private information to remain competitive, enhancing their decision-making processes and farming practices through increased technological awareness (Digital Economy Promotion Agency, 2017).

Agriculture, particularly durian cultivation, is the primary occupation in the area under study. The region boasts high durian yields per rai. Rayong Province prioritises quality durian production, with 2021 statistics showing a planting area of 101,034 rai, a harvest area of 68,555 rai, and a yield of 120,080 tonnes. Hence, this research explores whether adopting information communication technology (ICT) for knowledge exchange and information dissemination among durian farmers could enhance Rayong Province’s agricultural sector by increasing farmers’ incomes, improving product quality, and expanding export opportunities (Office of Agricultural Economics, 2022).

Web-Based Learning (WBL) represents an educational methodology leveraging web technology as the primary medium for content delivery and instructional interactions. According to Misra (2010), WBL is essential for agricultural practitioners in developing nations as it delivers flexible, accessible education that facilitates adaptation to globalisation challenges by transcending geographical limitations, reducing logistical expenses, and enabling expeditious knowledge dissemination for enhanced agricultural productivity and economic viability. This research implements WBL through the “Durian Digital Learning” platform, a specialised knowledge hub dedicated to durian cultivation and distribution systems. The platform functions as a comprehensive repository for expertise sharing and information dissemination, drawing upon empirical evidence from successful agricultural enterprises participating in the quality durian production initiative in Rayong Province. This educational resource serves both established farmers and prospective cultivators interested in durian production. The agricultural sector has experienced significant growth in durian cultivation due to escalating market values and expanding consumer demand, particularly within the Chinese market (Intelligent Center for Food Industry, 2023).

Durian WBL is an electronic platform for durian farmers that provides comprehensive information on durian cultivation, watering techniques, and fertilizer applications. Developed by a research team from the School of Agricultural Technology at King Mongkut's Institute of Technology Ladkrabang, it was created under the research project "Production and Marketing Information Management Innovation for Enhancing the Quality of Durian Production Entering into Premium Markets". As illustrated in Figure 1, the Durian Web-based Learning sitemap features a hierarchical structure with the Home Page at the top, branching into six main sections (Dashboard, Home Page, Online Course, Online CoPs, Online Events, and Contact). The system further expands into learning management components (analytics, knowledge management, assessment, progress) and community sections. The platform offers various features, including member and course management, assessments, reporting, online certificates, responsive design, data synchronization, and place-based learning, with connections to production and marketing data.

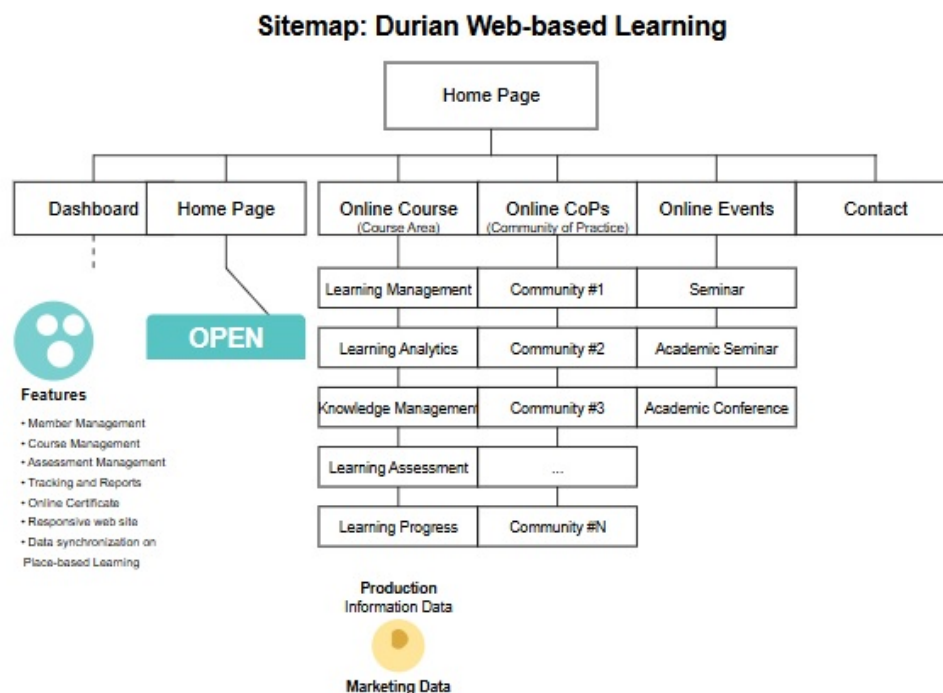


Figure 1. Durian Web-Based Learning (WBL)

Source: Suwanmaneepong *et al.* (2024)

Accordingly, this study examined the factors affecting the adoption and utilisation of WBL collaborative learning among quality durian farmers in Rayong Province, Thailand.

Materials and methods

Population and sample

The study population consisted of 200 community innovators from a durian production and marketing innovation project in Rayong Province (DPW, 2023). Using Taro Yamane's (1973) formula with a 95% confidence level, 134 participants were selected. These participants were durian farmers focusing on quality improvement for premium markets. The research covered four districts in Rayong Province (Klang, KhaoChamao, Mueang, and WangChan) across ten subdistricts.

Data collection

Data were collected via questionnaires from 134 farmers involved in the quality durian production initiative. The questionnaire was divided into two sections: general information and WBL usage factors. General information consisted of demographics, including gender, age, education level, planting area, experience, learning channels, media access frequency, and time spent online. WBL usage factors measured opinions using a five-point Likert scale from the lowest to highest impact across four dimensions: design aspects, content quality, usability, benefits, and applications.

Data analysis

Descriptive statistics were used in this study to analyse the demographic characteristics and farmers' opinions on WBL usage factors. Multiple regression analysis was employed to examine the relationships between farmers' characteristics and their opinions on WBL usage. Four regression models were analysed for the design, content, usability, and benefits dimensions using the enter method with significance at $p < 0.05$ (Mankeb, 2016). The regression equation was $Y = a + b_1X_1 + b_2X_2 + \dots + b_nX_n$, with Y representing the factors affecting WBL usage and X representing the independent variables.

Results

General basic information on WBL users

Among WBL users, the majority were male (57.46%), with a mean age of 38.45 years. Most farmers had an education level below a bachelor's degree

(77.61%) and managed durian plantations larger than five rai (76.87%). The majority had over five years of durian farming experience (73.88%) and preferred learning via applications (75.37%) rather than websites. Regarding media engagement, most users accessed media more than five times daily (53.73%), though they typically spent less than five hours per day on online media (73.88%).

Table 1. General basic information on users

	Number of People (n = 134)	Percentage (100%)
Gender		
Male	77	57.46
Female	57	42.54
Age	38.45	100.00
Education		
Below a bachelor's degree	104	77.61
Higher than a bachelor's degree	30	22.39
Planting Area		10.45
Less than five rai	31	23.13
More than five rai	103	76.87
Durian Growing Experience		
Less than five years	35	26.12
More than five years	99	73.88
Durian Production Learning Channels		
Application	101	75.37
Website	33	24.63
Access Frequency		
Less than five times	62	46.27
More than five times	72	53.73
Average Time Spent on Online Media Per Day		
Less than five hours	99	73.88
More than five hours	35	26.12
Total	134	100.00

Opinions on factors affecting the use of WBL

The opinions of quality durian farmers in Rayong Province, Thailand, on the factors affecting the use of WBL for collaborative learning, were high overall ($\bar{x} = 4.41$). The factors ranked from highest to lowest mean were benefits and applications ($\bar{x} = 4.56$), content ($\bar{x} = 4.41$), design ($\bar{x} = 4.40$), and efficiency ($\bar{x} = 4.26$), respectively (Table 2).

Table 2. Farmers' opinions on the factors affecting the use of web-based learning

Web-Based Learning	\bar{x}	S.D.	Satisfaction
Benefits and applications	4.56	0.01	Most
Content	4.41	0.04	More
Design	4.40	0.03	More
Usability	4.26	0.06	More
Total	4.41	0.03	More

In the analysis of factors affecting the design of WBL usage, two variables emerged as significant predictors at the 0.05 significance level: "access frequency" ($\beta = 0.290$, $p < 0.01$) and "durian growing experience" ($\beta = 0.200$, $p < 0.05$), as shown in Table 3. With a constant of 4.030, the regression equation in raw score form would be $Y = 4.030 + 0.510$ (access frequency) + 0.400 (durian growing experience). The model demonstrated modest explanatory power with $R^2 = 0.334$, indicating that the variables included in this analysis can explain approximately 33.4% of the variance in WBL usage design perceptions.

Table 3. General characteristics of farmers affecting the design of WBL usage

Variable	B	S.E.	Beta	t	Sig.
A (Constant)	4.030	0.390	-	4.030	0.390
Gender	0.160	0.160	0.090	1.010	0.320
Age	-0.010	0.010	-0.150	-0.150	0.120
Education	0.130	0.190	0.060	0.690	0.490
Planting area	0.090	0.200	0.043	0.440	0.660
Durian growing experience	0.400	0.190	0.200	2.080	0.040*
Durian production learning channels	0.190	0.190	0.090	0.990	0.320
Access frequency	0.510	0.170	0.290	3.070	0.001**
Average time spent on online media per day	-0.080	0.190	-0.040	-0.410	0.630

Note: Statistically significant at the 0.05, level, $R = 0.312$, $R^2 = 0.334$. Sig < 0.05*.

Analysis of the content factors identified two statistically significant predictors at $p < 0.05$ (Table 4). Again, access frequency had the strongest effect ($\beta = 1.60$, $p < 0.01$), followed by growing experience ($\beta = 0.78$, $p < 0.05$). The regression equation was represented as $Y = 4.28 + 0.13$ (access frequency) + 0.07 (growing experience), with a standardised form of $Z = 1.60$ (access frequency) + 0.78 (growing experience). Other demographic and usage variables exhibited no significant influence on content-related factors.

Table 4. General characteristics of farmers affecting WBL usage in terms of content

Variable	B	S.E.	Beta	t	Sig.
A (Constant)	4.280	0.190	-	23.030	0.001
Gender	-0.010	0.070	-0.010	-0.150	0.880
Age	0.001	0.001	-0.010	-0.100	0.920
Education	0.040	0.100	0.050	0.510	0.610
Planting area	-0.040	0.010	-0.410	-0.440	0.660
Durian growing experience	0.070	0.090	0.780	0.080	0.040*
Durian production learning channels	0.100	0.090	1.130	1.100	0.270
Access frequency	0.130	0.080	1.600	1.580	0.001*
Average time spent on online media per day	0.050	0.090	0.610	0.048	0.630

Note: Statistically significant at the .05, 0.01 level, $R = 0.202$, $R^2 = 0.624$. Sig < 0.05*, Sig < 0.01**

In the analysis of usability factors of WBL, education level emerged as the sole significant predictor at the 0.05 significance level ($\beta = 0.18$, $p = 0.05$), as shown in Table 5. With a constant of 4.00, the regression equation in raw score form was $Y = 4.00 + 0.21$ (Education), and the standardised equation $Z = 0.18$ (Education). Unlike the previous dimensions, neither access frequency nor growing experience had any significant effect on usability perceptions. Additionally, gender, age, planting area, learning channels, and media usage patterns exhibited no statistically significant influence on usability factors.

Table 5. General characteristics of farmers affecting the usability of WBL

Variable	B	S.E.	Beta	t	Sig.
A (Constant)	4.000	0.230	-	17.700	0.001
Gender	0.001	0.090	0.001	-0.020	0.980
Age	0.001	0.001	0.070	0.730	0.470
Education	0.210	0.110	0.180	1.980	0.050*
Planting area	0.110	0.120	0.090	0.950	0.340
Durian growing experience	0.040	0.110	0.030	0.340	0.740
Durian production learning channels	-0.050	0.110	-0.040	-0.470	0.640
Access frequency	0.080	0.100	0.080	0.810	0.420
Average time spent on online media per day	-0.100	0.110	-0.090	-0.930	0.350

Note: Statistically significant at the 0.05 level, $R = 0.228$, $R^2 = 0.456$. Sig < 0.05*

An analysis of benefits and applications yielded distinctly different results from the previous dimensions. None of the independent variables demonstrated any statistically significant influence ($p > 0.05$) on the farmers' perceptions of

the benefits and applications of WBL (Table 6). Despite the regression model including all eight variables (gender, age, education level, planting area, growing experience, learning channels, access frequency, and media usage time), no significant predictors emerged.

Table 6. General characteristics of farmers affecting the benefits and applications involved in WBL usage

Variable	B	S.E.	Beta	t	Sig.
A (Constant)	4.430	0.560	-	8.026	9.370
Gender	-0.160	0.220	-0.060	-0.710	0.480
Age	0.001	0.010	0.050	0.500	0.620
Education	-0.030	0.270	-0.010	-0.100	0.920
Planting area	-0.250	0.290	-0.090	-0.880	0.380
Durian growing experience	0.190	0.270	0.070	0.710	0.480
Durian production learning channels	-0.060	0.270	-0.020	-0.220	0.820
Access frequency	0.230	0.240	0.090	0.980	0.330
Average time spent on online media per day	-0.140	0.270	-0.050	-0.510	0.610

Note: $R = 0.187$, $R^2 = 0.374$.

Discussion

The study revealed that most WBL users were male (57.46%), with an average age of 38.45 years, education level below a bachelor's degree (77.61%), durian plantations exceeding five rai (76.87%), over five years of experience (73.88%), and a preference for learning via applications (75.37%). These findings align with Srisombat (2021), who noted that male farmers had a higher propensity for online learning technology adoption, and Hanthon (2020), who emphasised the importance of technological learning in enhancing production skills.

User satisfaction with WBL was high overall, with benefits and applications receiving the highest ratings ($\bar{x} = 4.56$), followed by content ($\bar{x} = 4.41$), design ($\bar{x} = 4.40$), and efficiency ($\bar{x} = 4.26$). These results correspond with those of SaiThong (2020), highlighting information accessibility and content quality as crucial factors in online learning environments. Two variables were found to significantly influence the design factors of WBL usage: frequency of media access ($\beta = 0.29$) and durian growing experience ($\beta = 0.20$). These findings contrast with those of Uthai (2019), who asserted that education primarily affects learning. Suksom (2020) found that the frequency of online media usage positively impacted agricultural skill development, suggesting that learning media should offer regularly updated, diverse content. Thongchan (2021)

emphasised incorporating real-world examples to facilitate practical knowledge application.

As for content, the same two variables were significant: frequency of media access ($\beta = 1.60$) and growing experience ($\beta = 0.78$). Unlike Boonchum's (2018) finding that education level affects content understanding, the results of this present study suggest content should be accessible to farmers of all education levels. Kaewsingh (2021) recommended the consistent presentation of new knowledge to encourage frequent farmer engagement, while Phanthawi (2020) advocated linking content to farmers' real experiences.

Regarding usability, education level emerged as the sole significant predictor ($\beta = 0.18$). This contrasts with Chaiwarangkun (2019), who suggests farmers with lower education struggle with complex media but aligns with Yodying (2021) and Khamai (2020), who found a correlation between higher education and improved media utilisation and technology adoption. Notably, demographic characteristics did not significantly influence farmers' perceptions of WBL benefits and applications, showing no statistically significant differences in how they valued WBL's practical utility.

In conclusion, effective WBL platforms for durian farmers should focus on accessibility, practical application, and regular engagement. Development should emphasise user-friendly interfaces accommodating varying experience levels, consistently updated relevant content, real-world case studies, and accessible information for farmers of all education levels.

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