Influence of the Affordance of Online Learning Platform Technology on the Entrepreneurial Behaviors of Students in Engineering and Technology Universities

Jing Zhang(✉)
Zhejiang Tourism College, Hangzhou, China
zjtczhangjing@163.com

Abstract—Information technology-based online teaching guarantees sustained teaching activities and ensures the sharing of abundant online educational resources and the convenient use of various online teaching tools. Online learning platforms possess massive teaching resources and solid teacher qualifications, which evidently enhance the learning efficiency of online learners, exert a direct effect on creating entrepreneurial knowledge of students in engineering and technology universities, and motivate their entrepreneurial behaviors. In this research, the scientific problem raised was the influence mechanism of the technological availability of online learning platforms on the entrepreneurial behaviors of students in engineering and technology universities. A questionnaire regarding the influence of the affordance of online learning platform technology on entrepreneurial behaviors was designed on the basis of technology affordance theory. Next, the influencing degrees of two component factors (educational and social affordability) of technology affordance on entrepreneurial behaviors were analyzed via a quantile regression model. Then, the moderating role played by online learning interaction in the positive promoting effect of technology affordance on entrepreneurial behaviors was measured. Results revealed that the overall Cronbach's α coefficient of the questionnaire was 0.905, and the Kaiser–Meyer–Olkin value was 0.853, indicating their favorable validity and reliability. The technology affordance (social and educational affordances) of online education platforms exerted a positive promoting effect on the entrepreneurial behaviors of students in engineering and technology universities. Learning interaction regulated such a promoting effect. Our results are of important reference values for extending the technology affordance perspective generated under the background of organizational reform, fulling mining the potentials of emerging technical tools on online education platforms and determining the influencing mechanism of the technology affordance of online education platforms on the entrepreneurial behaviors of students in engineering and technology universities.

Keywords—online learning platform, technology affordance, entrepreneurial behavior, moderating effect

1 Introduction

Education is generated with the birth of human society, develops with social development, and co-exists with human society. As a brand-new development model of education, online education has gradually become the primary pathway for autonomous learning. Information technology (IT)-based online teaching guarantees sustained teaching activities and ensures the sharing of abundant online educational resources and the convenient use of various online teaching tools. Under the background of online education, the learning system of a platform is a technical tool, and learners in the platform are goal-oriented doers who realize the affordance by taking certain actions based on the learning system and further complete learning. In the end, individual goals are accomplished. According to the opinions of adopting educational technologies and converting educational concepts from the perspective of technology affordance, the "learner-centered" principle is highlighted. Learners are encouraged to fully understand and mine technical tools of online platforms by combining individual goals and specific scenarios and realize direct concrete results supporting individual goals by virtue of their action potentials using technical tools. The reason why technology affordance is selected as the theoretical perspective is that it is suitable for exploring the effects of emerging technologies. Such affordance can also mine potential IT functions on online education platforms.

Chinese students in engineering and technology universities are extensively accepting entrepreneurship education and faced with an increasingly intense employment situation due to the superposed effects of various factors, such as COVID-19 and economic downturn, thus promoting the shift from offline education to online learning. These students are the main learning forces of most colleges and universities in China. Many engineering technical colleges have established characteristic practical training mechanisms, such as hackerspace, university student science parks, and entrepreneurship parks, endowing university students with natural entrepreneurial conditions. However, practice platforms are subjected to not flexible enough management and operation and a narrow scope of audience. At present, numerous online education platforms exist in China, owning abundant entrepreneurial educational resources, and this factor can become a significant educational mode of facilitating the entrepreneurial behaviors of university students. In possession of rich entrepreneurial educational resources, online education platforms can obviously exert a significant effect on predicting the entrepreneurial activities of students in engineering and technology universities after graduation by inviting famous entrepreneurs to narrate their entrepreneurial experiences. Accepting and perceiving profounder entrepreneurial education, university students become inclined to entrepreneurial activities after graduation. In online education scenarios, learners are willing to fully mine the potentials of emerging technical tools on platforms, give full play to such potentials through teaching interaction, finally form their cognitive construction regarding entrepreneurial knowledge and their sustained learning willingness, and further apparently promote their entrepreneurial behaviors by a definite date.

2 Theoretical foundation and research hypothesis

The conception of affordance originated from Heft's research [1] on animal perceptions of external environments, i.e., the perceptions of objects for physical properties. Subsequently, affordance has been used to explain the possibility for generating a behavior as recognized by the subject (under one environment) or it refers to the possibility for realizing a behavior that can be easily discovered, especially in man–machine interaction scenarios. With the continuous development of IT and social media, the conception of affordance starts being widely applied in the information system (IS) field. Technology affordance, a relational concept in essence, explains the possibility for realizing specific behavioral objectives through the interaction between IT and social subjects (individuals or organizations) and represents the relationship between technical objects and specific users (or user groups). Under social commercial scenarios, technology affordance theory properly reveals the mutual relationship between social commercial technological functions and user perceptions, including the influence of such an interaction on the specific behaviors that may be generated in social commerce. The technology affordance perspective renders its explanatory power through three core structures: affordance, realization process, and direct specific result. This theory lays a foundation for analyzing how the technology affordance of online learning platforms influences the entrepreneurial behaviors of learners.

Technology affordance theory has been widely concerned in the IS field. Specifically, it has been extended to all kinds of other fields. Being good at analyzing the relationship between doers and objects, technology affordance theory provides researchers with a perspective of researching technologies and the society. In this study, technology affordance theory is introduced in the online education field to provide a novel and appropriate theoretical perspective for the use of emerging technologies on online education platforms and the interactive behaviors in teaching. Strong et al. [2] identified the composition (educational and social affordances) of technology affordance in online education platforms, theorized its implementation process, gained a deep insight into the essence of technical tools on emerging online education platforms, and extended the perspective of technology affordance generated under the background of organizational reform. As for how to improve and promote college students' entrepreneurial behaviors using education technologies so that they are further willing to exhibit such behaviors, Daim et al. [3] thought that entrepreneurial behaviors are highly uncertain, discussed about factors influencing entrepreneurial behaviors, and developed a survey instrument. The results showed that entrepreneurial intention was influenced by genders, and the way of influence was impacted by the mother country of students. Afolabi [4] verified the usability levels of online learning tools and understood the degree of readiness of teachers and students for using online learning tools. The results suggested that only if online teaching approaches are introduced into college systems can students and teachers be willing to adopt online teaching. Mensink and King [5] analyzed the potential factors driving the access to feedback files in a learning management system (LMS). A total of 32 to-be-evaluated LMS access logs were organized, and students showed evident gender differences in the way of acquiring feedback in LMS, as it depended on the academic performance and score integration in feedback files. Porter and Graham [6]

Rperformed a questionnaire survey on 214 teachers implementing blended learning (BL) in Brigham Young University in the State of Idaho. The results reflected that sufficient infrastructure, technical support, teaching support, and evaluation data influence teachers to adopt the BL approach most significantly. Caliskan et al. [7] revealed that teachers are active in using Web2.0 tool. Students'abilities to actively participate in educational environment, support social interaction, and create content are considered to have positive influences on learning and may help enhance teachers' communication ability in public working areas in the future. As indicated by Martínez-Gautier et al. [8], the opportunity to gain technologies in schools is positively correlated with that to gain technologies at home, but learners' learning performance levels will not be affected in case of excessive reliance upon the usability and application of technical equipment. Sang et al. [9] investigated the influences of Chinese students and teachers on the use of information and communication technology (ICT). The results showed that expected ICT integration is significantly correlated with all teacher-related variables. Based on the results of path analysis models, the future ICT integration can be directly predicted according to the thinking variables of teachers. In an investigation on students and teachers, Dexter and Riedel [10] Efound that learner performance can be evidently improved if technologies are used by students and teachers in clinical experience. Babb and Ross [11] Cinvestigated whether classroom behaviors or examination results are influenced by the time when students acquire classroom slides. The results revealed that the average attendance rate is higher if slides before class exist. Usaci [12] analyzed the relationship between entrepreneurial intention and behavior and stated that learning attitude and proactive personality are the most predictive factors for entrepreneurial behaviors. Neto et al. [13] argued that self-efficacy can predict entrepreneurial behaviors, and age and educational background are entrepreneurial behavior-related demographic characteristics. Rauch and Hulsink [14] revealed that students participating in entrepreneurship education are prone to the increasing feelings of attitude and behavior control, and they have high entrepreneurial intention and exhibit follow-up behaviors of creating new enterprises through training programs. Yi, G [15] used a structural equation model to test the hypothetical models of 586 college graduates from two universities in China. The results suggested that college students' entrepreneurial behaviors can be obviously promoted by implementing green entrepreneurship education and combining cognitive education and behavior-oriented education. Tomy and Pardede [16] argued that college students' pioneering consciousness, self-skill consciousness, entrepreneurial resource, and entrepreneurship supporting network can be enhanced by increasing entrepreneurship education to markedly promote their entrepreneurial intention. Ashar et al. [17] revealed that online learning platforms realize the construction of e-learning community, can integrate the professional background into the learning experience, and use the learning network to promote self-efficacy and professional development. Zotova et al. [18] believed that the use of large-scale open online courses in engineering education has an impact on the access of students to key engineering skills. The effective combination of traditional classroom and virtual interaction can help improve the learning motivation of learners. According to existing literature, technology affordance theory has slowly permeated into the education field and aroused high attention from educational research personnel. However, the technology affordance of online education platforms has been scarcely investigated. In this research, therefore, technology affordance theory is mainly used to analyze the influences of two

components (educational and social affordances) of technology affordance in online education platforms on the entrepreneurial behaviors of students in engineering and technology universities. Meanwhile, online learning interaction is taken as a moderator variable to analyze its moderating role in the promoting effect of such technology affordance. Hence, the following three hypotheses are proposed:

> *H1: The technology affordance (educational affordance) of online education platforms exerts a positive promoting effect on the entrepreneurial behaviors of learners.*
>
> *H2: The technology affordance (social affordance) of online education platforms has a positive promoting effect on the entrepreneurial behaviors of learners.*
>
> *H3: Learning interaction plays a moderating role in the positive promoting effect of the technology affordance of online education platforms on the entrepreneurial behaviors of learners.*

3 Research design

The questionnaire survey method was employed to collect data and mainly explore the influence of the technology affordance of online learning platforms on students' online learning of innovative and entrepreneurial knowledge and their innovative and entrepreneurial behaviors. The specific research questionnaire designed included four aspects: First, the basic information of respondents (gender, grade, major, and time to contact online learning) was collected; second, the technology affordance of online learning platforms was measured. By reference to Kirschner et al. [19], such technology affordance was defined as the two following aspects: educational and social affordances corresponding to five and four measurement items, respectively; third, the entrepreneurial behaviors of students in engineering and technology universities were measured using the questionnaire of Covin and Slevin [20] with six items; fourth, online teaching interaction was measured. To facilitate learners to proceed toward teaching objectives and achieve them, the events occurring between learners and learning environments (learner–learner, learner–teacher, and learner–teaching content interactions) were measured using four, five, and four items, respectively, in reference to Wagner [21]. All questionnaires were measured via a five-point Likert scale.

Zhejiang Province is an economically developed province in China with a thick entrepreneurial climate. Numerous policies supporting university students to start up business have been formulated in Zhejiang, endowing it with an excellent entrepreneurship educational environment. In this research, a questionnaire survey was conducted among undergraduates from six mechanical universities located in Hangzhou, including Zhejiang University of Technology, Zhejiang University of Technology, Zhejiang University of Science and Technology, Zhejiang Shuren University, Hangzhou University of Electronic Science and Technology, and Zhejiang Agriculture and Forestry University. College students majoring in machinery have good entrepreneurial literacy, and the proportion of entrepreneurship among students is high. Impacted by COVID-19, some entrepreneurial curriculums have been taught by means of online teaching in this university. Students of different majors complete the learning of *Enterprise Practice*

through online learning. Our research group designed the questionnaire QR code and sent it to the person in charge of this school. Then, questionnaires were distributed online *via* the "SO JUMP" questionnaire survey website. Moreover, learners completing the course learning on online education platforms were invited *via* WeChat, phone calls, and e-mails to fill in the questionnaires. A total of 304 questionnaires were collected, and invalid ones with arbitrary answers or following certain laws were excluded according to the general exclusion criteria. Finally, 247 questionnaires that could be used for analysis were obtained, with an effective recovery rate of 81.25%.

Table 1. Descriptive statistical results of questionnaire survey respondents

Name	Option	Frequency	%
Gender	Male	205	83.00
	Female	42	17.00
Grade	Freshman	33	13.36
	Sophomore	76	30.77
	Junior	101	40.89
	Senior	37	14.98
Major	Mechatronic engineering	2	0.81
	Electrical engineering and automation	10	4.05
	Intelligent manufacturing engineering	170	68.83
	Industrial engineering	65	26.32
Time to contact online education	Less than one year	45	18.22
	1–3 years	59	23.89
	3–5 years	100	40.49
	Over 5 years	43	17.41

As seen in Table 1, male students accounted for 83% in such technical colleges. The grade and major distributions were relatively balanced. The time of 40.49% of the respondents to contact online education reached three to five years, which accorded with the actual situation.

4 Results

4.1 Reliability and validity tests

The first step of questionnaire research is to test the reliability and validity of the questionnaire. Cronbach's α coefficient is a measure of internal consistency, which refers to the relevancy of one group of measures as a whole. It is also regarded as a measurement of scale reliability. In general, Cronbach's α > 0.8 indicates a high reliability level.

Table 2. Reliability test results

Variable Type	Variable Name	Number of Questions Measured	Cronbach's α	Cronbach's α
Independent variable	Educational affordance (X1)	5	0.881	0.905
	Social affordance (X2)	4	0.905	
Dependent variable	Innovative and entrepreneurial behaviors (Y)	6	0.843	
Moderator variable	Learner–learner (M1)	4	0.860	
	Learner–teacher (M2)	5	0.874	
	Learner–teaching content (M3)	4	0.799	

As presented in Table 2, the overall Cronbach's α coefficient of the questionnaire was 0.905, and that of each specific variable was higher than 0.8, manifesting high data reliability. The overall reliability and stability of the questionnaire and those of each variable were high, so they could be used for further analysis.

All scales of this questionnaire were based on mature scales applied to related domestic and foreign studies. Moreover, they were modified repeatedly by combining online education scenarios. Before the final questionnaire was formed, a discussion was held with scholars and experts in the online education field. Thus, the questionnaire showed an excellent content validity.

Table 3. Kaiser–Meyer–Olkin and Bartlett tests

KMO		**0.853**
Bartlett sphericity test	Approximate chi-square	4155.547
	Degree of freedom	378
	p	0.000

The validity was verified through KMO and Bartlett tests. As displayed in Table 3, the KMO value was 0.853 (> 0.8), indicating high data suitability for information extraction.

Table 4. Average variance extract (AVE) and composite reliability (CR) results

Variable	AVE	CR
X1	0.614	0.887
X2	0.706	0.905
Y	0.510	0.855
M1	0.613	0.863
M2	0.589	0.876
M3	0.548	0.817

Table 4 shows that the AVE and CR values were greater than 0.5 and 0.7, respectively, manifesting high convergent validity.

Table 5. Discriminant validity: Pearson correlation and square root of AVE

	X1	**X2**	**Y**	**M1**	**M2**	**M3**
X1	0.778	–	–	–	–	–
X2	0.418	0.835	–	–	–	–
Y	0.438	0.264	0.716	–	–	–
M1	0.219	0.382	0.125	0.790	–	–
M2	0.420	0.495	0.242	0.448	0.767	–
M3	0.262	0.240	0.106	0.226	0.302	0.746

Table 5 presents that the square roots of AVE for all examined variables were greater than the maximum absolute value of the correlation coefficient among factors, thus verifying a favorable discriminant validity.

4.2 Quantile regression

Relative to ordinary least squares regression, quantile regression, which is more robust, can lead to more reliable conclusions. The influences of independent variables on dependent variables can be comprehensively analyzed by observing the regression coefficient values at different quantile points. Given the layered phenomenon of the technology affordance of online education, the quantile regression method was adopted in this research.

Table 6. Quantile regression

Quantile = 0.25, R² = 0.157	**Regression Coefficient**	**Standard Error**	**t**	**p**	**95% Confidence Interval (CI)**
c	1.691	0.314	5.393	0.000***	1.074–2.309
X1	0.514	0.073	7.028	0.000***	0.370–0.658
X2	0.014	0.067	0.212	0.832	−0.117–0.146
Quantile = 0.50, R² = 0.100	**Regression Coefficient**	**Standard Error**	**t**	**p**	**95% CI**
C	2.505	0.26	9.625	0.000***	1.992–3.018
X1	0.319	0.062	5.179	0.000***	0.197–0.440
X2	0.098	0.057	1.713	0.088*	−0.015–0.211
Quantile = 0.75, R² = 0.077	**Regression Coefficient**	**Standard Error**	**t**	**p**	**95% CI**
c	3.167	0.259	12.217	0.000***	2.656–3.677
X1	0.208	0.066	3.173	0.002***	0.079–0.338
X2	0.125	0.058	2.144	0.033**	0.010–0.240

As seen from Table 6, three models (corresponding to quantile points of 0.25, 0.50, and 0.75) were estimated. Except that the regression coefficient of X2 in the model corresponding to the quantile point of 0.25 was insignificant, the regression coefficients of all independent variables in other models were relatively significant.

H1 holds true. In an online education platform, learners perceive and identify its education affordance and are clear about what specific learning behaviors they can accomplish by using technical tools, such as planning their learning objectives through the learning task management function; acquiring the courses they want to learn via the platform search engine; monitoring their own learning behaviors by virtue of the progress management function; evaluating their learning outcomes by an online testing module; summarizing and reflecting by keeping online logs and sharing learning resources with other learners and teachers. Education affordance decides learners' way of exhibiting specific learning behaviors on online education platforms, including learning process (planning, information acquisition, evaluation, and review), innovative synthesis (creation, adjustment, and integration), and individualization (supervision and management).

H2 is supported. In an online education platform, learners perceive and identify its social affordance and are clear about what social activities they can accomplish by using technical tools, such as communicating with other learners and teachers through synchronous and asynchronous social tools; raising questions to other learners and teachers on question-and-answer (Q&A) and mutual-aid forums and discussing with each other to reflect upon knowledge; forming learning groups with other learners in online communities; and helping each other finish homework projects. Social affordance facilitates social communication among learners on online education platforms, involving cognitive aspects (communication, seeking for help, sharing, and collaborative learning) and emotional aspects (ties, feedback, rapports, emotional expressions, and social support). In an online education platform, learners perceive and identify its learning tools, such as task planning tools, information search tools, test evaluation tools, learning content saving and look-back tools, multimedia creations, editing and integration tools, learning progress supervision tools, and content management tools. They also think of what learning behaviors they can perform. With such tools, learners accept teaching, guidance, and supervision from teachers and answer their questions, proactively acquire learning contents, complete thinking and learning, and dialogue with themselves (interaction with contents). In an online education platform, students in engineering and technology universities perceive and identify its social tools (e.g., synchronous and asynchronous communication tools, forum Q&A tools, experience and resource sharing tools, and community collaborative learning tools) and consider what social behaviors they can perform, such as communicating with other learners, expressing their own emotions, and forming harmonious social relationships; seeking for help from teachers; and gaining answers to questions to complete interactions with other learners and teachers.

4.3 Moderating effect

Table 7. Moderating effect

Varible	Model 1	Model 2	Model 3
Constant	4.113*** (115.967)	4.113*** (115.736)	4.093*** (110.153)
Technology affordance	0.381*** (7.624)	0.383*** (7.383)	0.403*** (7.608)
Learning interaction	–	−0.008 (−0.149)	−0.008* (−0.153)
Technology affordance *Learning interaction	–	–	0.147 (1.716)
ΔF	F (1,245) = 58.131, $p = 0.000$	F (1,244) = 0.022, $p = 0.882$	F (1,243) = 2.946, $p = 0.087$

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

H3 is true, as evidenced in Table 7. The interaction term between technology affordance and learning interaction was significant at the 10% level ($t = 1.716$, $p = 0.087 < 0.10$), indicating that learning interaction plays a moderating role in the promoting effect of technology affordance on the innovative and entrepreneurial behaviors of learners.

In an online education platform, learners gain a deep understanding of knowledge, master learning methods, and improve their thinking ability through teaching interaction. In addition, learners form learning groups with other learners to co-finish subject tasks and share learning experiences; communicate with teachers who will answer questions that are difficult to be comprehended by learners; interact with contents; and summarize and reflect upon the learned contents to recreate knowledge. In terms of the learner–learner interaction, learners organize a learning community with like-minded classmates by using technical tools to share network learning resources and learning experiences, identify groups to express themselves, and conduct collaborative learning with others. For the learner–teacher interaction, learners accept teaching, guidance, supervision, and feedback from teachers via technical tools and seek for answers to their questions. With regard to the learner–contact interaction, learners can proactively search, acquire, learn, and store extracurricular learning resources by using technical tools according to their own learning objectives, actively finish learning tasks and after-class assignments, complete self-assessment and put effort into self-consolidation and improvement, and proactively make self-reflection.

5 Discussion

At present, how IT can promote meaningful learning and enhance university students' entrepreneurial behaviors in online education have become research hotspots. Rogers [22] believed that meaningful learning is not only the learning of accumulating facts but also a kind of ubiquitous learning, which permeates every part of the existence of learners. Therefore, online education platforms have become important tools

to achieve effective learning. Mayer [23] argued that meaningful learning occurs when learners establish the knowledge and cognitive processes needed to successfully solve problems. Meaningful learning is consistent with constructivist theory, and its manifestation is good memory and good transfer ability by Veryaeva and Solovyeva [24]. Therefore, the technology availability of online education platform is of great value to the entrepreneurial behaviors of learners.

The results of hierarchical regression model show that educational and social availability can have significant impacts on the entrepreneurial behaviors of learners. Online education platform development companies must pay attention to the impact of online education platform technology availability on the innovative behaviors of learners. Ling et al. [25] should also attach importance to developing learning achievement assessment tools to improve learners' knowledge cognition, develop information search tools to facilitate learners' knowledge retrieval, develop multimedia editing tools to encourage learners' creative integration, use artificial intelligence to provide learners with personalized learning programs, and build a learner-centered learning environment by Parra and Ruiz [26]. Moreover, these companies must provide additional social ways, for example, develop rich synchronous and asynchronous communication tools to facilitate learners' social communication, emotional expression, and relationship building and develop learning communities to promote shared communication and collaborative learning among learners by Branon and Essex [27].

The mediating effect confirms that the educational and social availability in an online education platform has a positive impact on cognitive construction and entrepreneurial behavior through learner–learner, learner–instructor, and learner–content interactions. Online learning platforms can improve the cognitive construction and entrepreneurial behavior of students' online learning by Obschonka et al. [28], so enhancing technological availability is necessary. Specifically, online education platforms should make full use of emerging IT to provide learners with as much action potential as possible and enhance the possibilities of entrepreneurial behaviors.

Given that online teaching platforms are relatively unfamiliar to learners, teachers should actively lead students to familiarize themselves with and use the technical tools of these platforms, promote communication and exchange between learners and other learners, share experience and learning resources, promote mutual encouragement and competition among learners, and make learners form a sense of community by Rova [29] and a sense of belonging by Freeman et al. [30]. Teachers should also actively communicate with learners, actively guide learners to learn, urge them to learn when they are behind schedule, and lend a helping hand when they have problems. Finally, teachers must guide students' autonomous learning by Brooman, and Darwent [31] and promote their review and reflection after learning by Adedoyin, and Soykan [32] to consolidate their learning achievements and arouse their entrepreneurial behaviors.

6 Conclusion

Online education, a brand-new development model, has gradually become a primary path for autonomous learning. Fundamentally, online education refers to the selection and learning behaviors of users generated by interacting with network courses and

combining their own needs. From the theoretical perspective of technology affordance, the potential functions of IT on online education platforms can be accurately mined, and the symbiotic relationship between human behaviors and technical capabilities can be dug. Moreover, interpreting and mining emerging technological functions by combining their own abilities and scenarios is suitable for individuals. In this research, the influencing degrees of two constituent factors (educational and social affordances) on entrepreneurial behaviors were analyzed using a quantile regression model based on technology affordance theory. The moderating role was played by online learning interaction in the positive promoting effect of technology affordance on the entrepreneurial behaviors of students in engineering and technology universities. Our results manifested that the overall Cronbach's α coefficient of the questionnaire was 0.905 and the KMO value was 0.853, indicating excellent questionnaire validity and reliability. The following conclusions were drawn. The technology affordance (social and educational affordances) of online education platforms exerts a positive promoting effect on the entrepreneurial behaviors of students in engineering and technology universities, in which learning interaction plays a moderating role. Hence, targeting at the implementation mechanism of technology affordance of online education platforms, whether different types of courses learned have significantly different influences on the entrepreneurial behaviors of students should be analyzed. Moreover, the online entrepreneurship educational curriculum system may be perfected, and online entrepreneurial knowledge-related activities should be carried out to enrich the research within this field.

7   References

[1] Heft, H. (1989). Affordances and the body: An intentional analysis of Gibson's ecological approach to visual perception. Journal for the Theory of Social Behaviour, 19(1), 1–30. https://doi.org/10.1111/j.1468-5914.1989.tb00133.x

[2] Strong, D. M., Johnson, S. A., Tulu, B., & Trudel, J. (2014). A theory of organization-EHR affordance actualization. Journal of the Association for Information Systems, 15(2), 53–85. https://doi.org/10.17705/1jais.00353

[3] Daim, T., Dabic, M., & Bayraktaroglu, E. (2016). Students' entrepreneurial behavior: International and gender differences. Journal of Innovation and Entrepreneurship, 5(1), 1–22. https://doi.org/10.1186/s13731-016-0046-8

[4] Afolabi, A. A. (2015). Availability of online learning tools and the readiness of teachers and students towards it in Adekunle Ajasin University, Akungba-Akoko, Ondo State, Nigeria. Procedia-Social and Behavioral Sciences, 176, 610–615. https://doi.org/10.1016/j.sbspro.2015.01.517

[5] Mensink, P. J., & King, K. (2020). Student access of online feedback is modified by the availability of assessment marks, gender and academic performance. British Journal of Educational Technology, 51(1), 10–22. https://doi.org/10.1111/bjet.12752

[6] Porter, W. W., & Graham, C. R. (2016). Institutional drivers and barriers to faculty adoption of blended learning in higher education. British Journal of Educational Technology, 47(4), 748–762. https://doi.org/10.1111/bjet.12269

[7] Caliskan, S., Guney, Z., Sakhieva, R., Vasbieva, D., & Zaitseva, N. (2019). Teachers' views on the availability of web 2.0 tools in education. International Journal of Emerging Technologies in Learning (iJET), 14(22), 70–81. https://doi.org/10.3991/ijet.v14i22.11752

[8] Martínez-Gautier, D., Garrido-Yserte, R., & Gallo-Rivera, M. T. (2021). Educational performance and ICTs: Availability, use, misuse and context. Journal of Business Research, 135, 173–182. https://doi.org/10.1016/j.jbusres.2021.06.027

[9] Sang, G., Valcke, M., Van Braak, J., & Tondeur, J. (2010). Student teachers' thinking processes and ICT integration: Predictors of prospective teaching behaviors with educational technology. Computers & Education, 54(1), 103–112. https://doi.org/10.1016/j.compedu.2009.07.010

[10] Dexter, S., & Riedel, E. (2003). Why improving preservice teacher educational technology preparation must go beyond the college's walls. Journal of teacher education, 54(4), 334–346. https://doi.org/10.1177/0022487103255319

[11] Babb, K. A., & Ross, C. (2009). The timing of online lecture slide availability and its effect on attendance, participation, and exam performance. Computers & Education, 52(4), 868–881. https://doi.org/10.1016/j.compedu.2008.12.009

[12] Usaci, D. (2015). Predictors of professional entrepreneurial intention and behavior in the educational field. Procedia-Social and Behavioral Sciences, 187, 178–183. https://doi.org/10.1016/j.sbspro.2015.03.034

[13] Neto, R. D. C. A., Rodrigues, V. P., Stewart, D., Xiao, A., & Snyder, J. (2018). The influence of self-efficacy on entrepreneurial behavior among K-12 teachers. Teaching and Teacher Education, 72, 44–53. https://doi.org/10.1016/j.tate.2018.02.012

[14] Rauch, A., & Hulsink, W. (2015). Putting entrepreneurship education where the intention to act lies: An investigation into the impact of entrepreneurship education on entrepreneurial behavior. Academy of Management Learning & Education, 14(2), 187–204. https://doi.org/10.5465/amle.2012.0293

[15] Yi, G. (2021). From green entrepreneurial intentions to green entrepreneurial behaviors: The role of university entrepreneurial support and external institutional support. International Entrepreneurship and Management Journal, 17(2), 963–979. https://doi.org/10.1007/s11365-020-00649-y

[16] Tomy, S., & Pardede, E. (2020). An entrepreneurial intention model focussing on higher education. International Journal of Entrepreneurial Behavior & Research, 26(7), 1423–1447. https://doi.org/10.1108/IJEBR-06-2019-0370

[17] Ashar, M., Kamdi, W., & Kurniawan, D. T. (2021). Professional skills development through the network learning community using an online learning platform. International Journal of Interactive Mobile Technologies (iJIM), 15(12), 202–210. https://doi.org/10.3991/ijim.v15i12.21587

[18] Zotova, M., Likhouzova, T., Shegai, L., & Korobeynikova, E. (2021). The use of MOOCS in online engineering education. International Journal of Engineering Pedagogy (iJEP), 11(3), 157–173. https://doi.org/10.3991/ijep.v11i3.20411

[19] Kirschner, P., Strijbos, J. W., Kreijns, K., & Beers, P. J. (2004). Designing electronic collaborative learning environments. Educational Technology Research and Development, 52(3), 47–66. https://doi.org/10.1007/BF02504675

[20] Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. Strategic Management Journal, 10(1), 75–87. https://doi.org/10.1002/smj.4250100107

[21] Wagner, E. D. (1994). In support of a functional definition of interaction. American Journal of Distance Education, 8(2), 6–29. https://doi.org/10.1080/08923649409526852

[22] Rogers, C. R. (1959). Significant learning in therapy and in education. Educational Leadership, 16(4), 232–242.

[23] Mayer, R. E. (1996). Learning strategies for making sense out of expository text: The SOI model for guiding three cognitive processes in knowledge construction. Educational Psychology Review, 8(4), 357–371. https://doi.org/10.1007/BF01463939

[24] Veryaeva, K., & Solovyeva, O. (2021). The influence of gamification and platform affordances on user engagement in online learning. International Journal of Distance Education Technologies (IJDET), 19(1), 1–17. https://doi.org/10.4018/IJDET.2021010101

[25] Ling, G., Bochenek, J., & Burkander, K. (2015). Using the Major Field Test for a bachelor's degree in business as a learning outcomes assessment: Evidence from a review of 20 years of institution-based research. Journal of Education for Business, 90(8), 435–442. https://doi.org/10.1080/08832323.2015.1095703

[26] Parra, J. F., & Ruiz, S. (2009). Consideration sets in online shopping environments: The effects of search tool and information load. Electronic Commerce Research and Applications, 8(5), 252–262. https://doi.org/10.1016/j.elerap.2009.04.005

[27] Branon, R., & Essex, C. (2001). Synchronous and asynchronous communication tools in distance education. TechTrends, 45(1), 36–42. https://doi.org/10.1007/BF02763377

[28] Obschonka, M., Silbereisen, R. K., & Schmitt-Rodermund, E. (2012). Explaining entrepreneurial behavior: Dispositional personality traits, growth of personal entrepreneurial resources, and business idea generation. The Career Development Quarterly, 60(2), 178–190. https://doi.org/10.1002/j.2161-0045.2012.00015.x

[29] Rovai, A. P. (2002). Building sense of community at a distance. International Review of Research in Open and Distributed Learning, 3(1), 1–8. https://doi.org/10.19173/irrodl.v3i1.79

[30] Freeman, T. M., Anderman, L. H., & Jensen, J. M. (2007). Sense of belonging in college freshmen at the classroom and campus levels. The Journal of Experimental Education, 75(3), 203–220. https://doi.org/10.3200/JEXE.75.3.203-220

[31] Brooman, S., & Darwent, S. (2014). Measuring the beginning: A quantitative study of the transition to higher education. Studies in Higher Education, 39(9), 1523–1541. https://doi.org/10.1080/03075079.2013.801428

[32] Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: The challenges and opportunities. Interactive Learning Environments, 1–13. https://doi.org/10.1080/10494820.2020.1813180

8   Author

Jing Zhang, Master's degree, Associate professor at the School of Hospitality Management, Zhejiang Tourism College. Her research interests focus on eco-tourism and tourism education. (Email: zjtczhangjing@163.com).