Article

Advancing Farmers' Vocational Education: Innovative Strategies and Practices for Integrating Financial Literacy Enhancement in China

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Abstract

This study proposes an innovative approach to vocational education for farmers in China, integrating financial literacy enhancement as a key component. Recognising the critical role of financial competence in rural economic development, we address the current disconnect between traditional educational methods and the practical needs of rural residents in the context of China's rapidly transforming agricultural sector. Our research introduces a novel educational model grounded in embodied cognition theory, designed to bridge the gap between abstract financial concepts and the lived experiences of farmers. The proposed model emphasises experiential learning and contextualised instruction, featuring a multi-stage process that includes observation of daily agricultural and financial activities, hands-on practical training, conceptual explanation linked to farm operations, and applied learning in real agricultural contexts. This approach prioritises body-environment interactions and practical reflection, leveraging farmers' daily experiences to enhance both vocational skills and financial literacy. Key innovations include the use of body metaphor mapping to explain complex financial concepts, the integration of financial education into broader agricultural training, and the creation of embodied learning environments that simulate real-world farming scenarios. The model aims to simultaneously improve farmers' professional competencies and financial decision-making abilities, fostering a more holistic approach to rural vocational education. Our study employed a mixed-methods approach, combining qualitative interviews with agricultural educators and quantitative surveys of farmers to develop and refine the model. Initial pilot implementations

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in select rural areas of China have shown promising results in improving farmers' financial knowledge and decision-making skills. These findings offer practical insights for educators, policymakers, and agricultural extension services, demonstrating how vocational training can be reimagined to address the multifaceted needs of rural communities in China. By integrating financial literacy into broader vocational education, this approach has the potential to enhance farmers' overall economic resilience and contribute to sustainable rural development. The study paves the way for more effective, contextually relevant educational strategies that can empower farmers with the skills needed to thrive in an increasingly complex agricultural and financial landscape.

Keywords: farmers' vocational education; embodied cognition; teaching strategies; financial literacy; rural development

Introduction

The agricultural sector in China has been experiencing a deep-seated change as a result of rapid modernisation and a more diversified rural economy (Zhang et al. 2023). This evolution is changing the face of farming and calls for a revaluation of a whole host of farmers' vocational skills and general competencies. Moving from practices that have long been in practice to far more advanced and finance-driven approaches, these farmers are finding themselves involved in both agriculture and finance, implying a completely new domain of expertise unrelated to those they would gain through normal farming training. Traditionally, China's farmers' vocational education is mainly built around agricultural production skills, such as cultivation techniques, animal raising, and machinery training (Hepper 2017). But with the acceleration of agricultural modernisation and the promotion of rural revitalisation strategies in recent years, such narrowness is no longer adequate. Agriculture in China today extends beyond traditional production to include business management, marketing, and other technologies (Wang, Zhang, and Zhang 2023). In the Chinese case, production proficiency will no longer sufficiently meet challenges of contemporary agriculture.

The diversification of the rural economy in China has made many farmers more likely to practise non-agricultural or part-time activities, which require cross-disciplinary knowledge such as entrepreneurship, service industry skills, and e-commerce. This transformation is particularly marked in areas frantically urbanising and industrialising, turning many farmers into part-time farmers or agripreneurs (farmer entrepreneurs). The integration of financial literacy education into farmers' vocational training represents a forward-thinking strategy for educational innovation in this changing arena (Peng and Tang 2022). This combinational strategy can improve farmers' overall capacity and contribute to rural economic development in China. Training farmers in financial literacy will help increase their knowledge about financial decisions, which are crucial for proper functioning of modern agricultural operations.

Improved financial literacy for Chinese farmers facilitates their access to modern financial instruments and services in rural markets, given that financial inclusion efforts are enhancing, thereby increasing the range of today's rural market (Wang et al. 2023). Extensive financial literacy can make farmers able to choose suitable financial products and use credit and insurance, tools necessary for production and risk management in the face of the changes in the agricultural Chinese market system. Finally, greater financial literacy education can also raise Chinese farmers' risk awareness and prevention capacity, which are crucial as the rural finance in China has been quite dynamic. Since the country's financial market is expanding, smallholder farmers who are mostly uneducated and have no sound knowledge of finances may be defrauded or left out of economic opportunities. The development of a standardised financial education programme can cultivate the awareness of farmers to avoid financial risks such as illegal fundraising and usury, and protect their legitimate rights and interests in an increasingly complicated financial market. It will also promote rural financial innovation, development, and competitiveness by increasing the number of financially literate rural populations in China as a whole. Farmers with more financial literacy are also likely to have broader and more sophisticated financial services requirements, which may force institutions to accommodate rural features in their products and services responding to the dynamics of the remote rural financial market.

As contemporary development trends and national policies for rural revitalisation in China change, the country is trying to integrate lessons of farmers' financial literacy learning within vocational training programmes (Flannery, Keaveney, and Murphy 2024). This will enhance farmers' personal capabilities and quality of life, as well as rural economy subsidies and it will have a real effect on rendering the rural vitality strategy line truly in place. The authors recognise that these demands are changing and propose a new conceptual framework for financial literacy through the lens of embodied cognition that provides practical, farmer-targeted financial education. Embodied cognition suggests that the interaction of the body with the environment shapes cognitive processes (Allen and Friston 2018). Applying this theory to the financial education field, we suggest a framework that capitalises on farmers' practical experiences and environmental engagements in order to increase their appropriation of more abstract financial concepts.

Our research objectives are:

1. To construct a model that encompasses positive financial skills training among farmers within vocational education and training centres based on embodied cognition theory;

2. To design creative teaching strategies to address the unique challenges of financial literacy education in rural China;

3. To assess effects on farmers and measure their ability to make good financial decisions and their overall economic resilience.

Our study seeks to answer some of these questions and, in doing so, adds to the small but growing literature on financial literacy education within farmers' vocational programmes (Fielke and Bardsley 2014). Our purpose is to inform policymakers, educators, and rural development practitioners on the potential pathway for sustainable development in China's agricultural sector and rural communities. However, this strategy requires educational content and methodologies to be carefully developed based on the circumstances farmers actually experience of practising agriculture so that the content and benefits from this modern approach are disseminated to other farming communities (Ma et al. 2009). Our study also serves to assist farmers with an interest in entrepreneurship by means of financial management and economic support, which can improve their sustainability in the agricultural and non-agricultural sectors (Yadav and Ali 2016).

Challenges of Financial Literacy Education in Rural China

In rural China, the current busyness and challenges within the financial literacy education landscape have a direct impact on the delivery and utilisation of financial knowledge. These represent a complex and multifaceted problem due partially to the broad array of challenges, ranging from resource scarcity to methodological deficiencies (Sui and Niu 2018; Yang, Wu, and Huang 2023). Recognising and addressing these challenges are key considerations for effective teaching, especially using pedagogical techniques founded on embodied cognition theory (Fernandes, Lynch, and Netemeyer 2014; Kaiser et al. 2022). Challenges can be grouped into four primary areas: infrastructural, pedagogical, contextual, and systemic challenges.

Infrastructural Challenges

With the example of China, in rural areas there is an acute shortage not only of trained instructors able to impart financial knowledge comprehensively, but also consistent education institutions that offer professional courses on finance. Insufficient teaching resources such as textbooks and information technology (IT) equipment have worsened the human capital deficit (Goyal and Kumar 2021; Xu et al. 2022). An example is a survey by Tan et al. (2022). The resulting disconnection in educational provision stands as a significant barrier to rural people accessing sustained and systematic financial learning opportunities. The above infrastructure gap connects the major financial education service platforms, causing not only a low coverage of financial education in rural areas but also different degrees of non-standard and poor-quality education in financial services among various places.

Pedagogical Challenges

In rural China, financial education is generally simple and single-oriented with traditional teaching methods (lectures) and materials (printed matter). As these

initiatives are aloof, they usually do not inspire real attention or activism from rural people. A study by Yang, Wu, and Huang (2023) found 72% of rural financial education programmes in China used only lectures without having an interactive or experiential learning element. A major drawback of providing rarely examined course-only financial education is that students may find it difficult to translate ideas into meaningful actions due to the lack of inter-activeness or experiential nature of the education, and subsequently there will be poor absorption and internalisation levels (Xiao and O'Neill 2016). What is more, the single direction of teaching ignores the facts of life and local knowledge already existing in rural people, creating a divergence between theory instruction and real application (Hastings, Madrian, and Skimmyhorn 2013). The trick is to create a pedagogy that can fill this gap and help make financial concepts more relatable and relevant while also impacting the daily life perspectives among the villagers.

Contextual Challenges

According to Yu (2022), the problems in financial education curriculum development also include that most of the current routine designs are from an urban perspective, and less consideration is given to specific needs and scenarios relevant to rural life. The highly seasonal nature of rural economic activities and the high risks associated with agricultural production make financial instruments difficult to mobilise. The problem is that most knowledge deployed through educational content does little to capture those rural characteristics, and so can easily appear irrelevant or even a form of alienation from the lived experiences of people in these rural areas.

Systemic Challenges

Sustainability and the systemic nature of education are challenges to financial literacy in rural China. Most financial education activities are ad-hoc and short-term-oriented without long-term planning and a follow-up (Chen, Lu, and Wang 2022). This gap in the provision of finance education leads to knowledge loss and little impact upon rural residents keeping abreast with fast-changing financial markets, which impacts them in terms of current and new financial products. In addition, there is lack of sustainable, larger scale programme evaluation to get evidence based on the effectiveness of educational interventions in rural areas or to determine how best to fit offerings for the needs of a changing rural learner. For example, Smart (2018) notes that few rural financial education programmes in China implement systematised evaluation mechanisms, so that success rates of these programmes are only around 12%. This data gap prevents what should be a viral loop of ever-improving educational modules and teaching strategies, ultimately driving down the efficacy of rural financial education programming. Financial capability programmes—such as those that promote financial education, coaching or counselling—are designed to deliver services and intervention strategies to improve consumer outcomes in low- or moderate-income communities living in rural America. The dominant "one-size-fits-all" style is unable to suit the differentiated needs and learning styles of different social classes (Yang, Wang, and Liu

2024). For example, current educational practices usually do not consider significant discrepancies in learning styles and content preferences between old and young generations, which leads to the limited effectiveness of programmes (Birochi and Pozzebon 2016).

These challenges combined pose a great challenge to improving the financial literacy of Chinese rural residents. A shift towards a holistic intervention is needed that not only increases resource allocation but also transforms pedagogies, diversifies curriculum, and establishes viable comprehensive long-term educational penumbra. Historically, efforts to solve these problems have been undertaken with a myopic view: if only we offered more financial education programmes or distributed more educational materials. Every attempt to solve these problems has had one thing in common: they have failed to consider how interdependent they are. For example, efforts to broaden the provision of financial education materials have proved insufficient to improve financial literacy outcomes without consideration of their meaning in context and the pedagogical approaches employed (Xu et al. 2022).

These challenges, and the way they exacerbate one another, make it critical to find a systemic solution. Pedagogical challenges are then compounded due to infrastructural limitations and further made redundant by contextual irrelevance, which can undercut the effectiveness of even the best laid programmes. Other challenges are similarly difficult to address since systemic issues such as lack of continuity and adequate assessment stand in the way. Accounting for the complex adaptive problems laid out here, our own research offers an imaginative alternative inspired by embodied cognition theory. Without crossing the boundaries of current understanding in Chinese rural areas, it provides an innovative, relevant, and scalable model for financial literacy education. In facing these areas of need directly, we aim to create pedagogies that are not only more successful but also complementary to the specific challenges and experiences faced by those living in rural areas, leading to improved financial capability and economic strength among rural communities (Chen, Lu, and Wu 2022; Kaiser and Menkhoff 2017; Yu 2022).

Integrating Embodied Cognition Theory with Financial Literacy Education

One of the major developments in cognitive science and psychology is the recognition that cognition is embodied, and it significantly shifts the paradigm of human cognitive processes (Allen and Friston 2018; Mahon 2015). This theory consists of cognitive rules in the traditional cognitive environment, which is a challenge to the traditional theory of cognition (Wang and Zheng 2018), and it brings new enlightenment to financial education for rural China.

Basics of Embodied Cognition Theory

Embodied cognition is based on a more general claim that mental processes are constitutively dependent upon both our physical bodies and the specific environment to which they relate, and as such should not be confined to a process of information processing within the brain (Anderson 2003; Dove 2011). Embodied cognition theory proposes that cognition cannot occur without the body (Davis et al. 2012; Friston 2012). The notion that the way we make sense of the world is deeply conditioned by our bodies is a core theme in this kind of thinking. As an example, we often use metaphors that are grounded in bodily experience to make sense of abstract themes (Günther, Rinaldi, and Marelli 2019). Even the concept of understanding is itself often conveyed as the idea of "grasping" something, highlighting how we interface our abstract, reasoning minds with the lens of physical action. Similarly, according to embodied cognition theory, the environment plays a key role in cognitive processes. We do not have thoughts that emerge without provocation and arise out of nowhere. Our thinking is the outcome of a continuous exchange with everything around us. Our cognitive resources find reception in the environment and in this way, it shapes our perceptual frameworks as well. In other words, when we solve a series of complex calculations with the help of a calculator, we are "outsourcing" ourselves to carry out some part of our cognitive process. It provides an outside view on how we can re-understand and improve learning processes, particularly in financial education (Nemirovsky and Ferrara 2009).

Using Embodied Cognition Theory in Rural Financial Education

The construction of financial literary education based on embodied cognition theory provides some pioneer approaches, which are highly suitable in primary and elementary rural China (Chen et al. 2020; Moscarola and Kalwij 2021). The main applications of embodied cognition theory in rural financial literacy education are summarised in Figure 1.

1. Experiential learning: This theory highlights the need to experience financial education, with students having firsthand experience in real-life scenarios. Teaching pure theory may be less influential than simulating actual transactions or directly participating in financial management activities (Lührmann, Serra-Garcia, and Winter 2018; Walstad, Rebeck, and MacDonald 2010).

2. Environmental design: The theory of environmental design and the role of the environment in learning suggest an environment suitable for financial teaching, which may involve scenario visualisation and interactive learning platforms that can support the intuitive understanding of personal finance (Cordero, Gil-Izquierdo, and Pedraja-Chaparro 2022).

3. Improving applications: People are more likely to learn if they can immediately apply their education in real life (Berry, Karlan, and Pradhan 2018; Skimmyhorn 2016).

4. Based on social interaction: It basically highlights the social interaction in learning. Rural residents can engage in group discussions, role-playing exercises and other co-operative activities whereby they share their knowledge and learn from one another.

5. Physical activities: A further innovative method inherited from an embodied cognition perspective is the integration of physical activities into the learning process (Goldinger et al. 2016). For example, explaining financial concepts using hand gestures or even constructing games with overall body involvement can help in gaining better results.

6. Understanding utility of tools: It is essential to help rural dwellers appreciate the role of external tools (e.g., calculators, smartphone applications [apps]) in financial decision-making and practice in using these to manage finances (Giofré 2017; Harvey 2019).

7. Multisensory learning: Using the model to teach financial concepts through more than one channel—sight, sound, and touch—makes it easier for all people to understand and compare explanations through modes.

8. Emotional factors: Recognising the role of emotional factors (risk attitudes, emotional ties to money) in financial decisions can increase the relative effectiveness of education programmes (Brown et al. 2016).

Finally, this theory also suggests the necessity for extensive practice (Walstad and Wagner 2023). It is necessary to think about financial literacy not as giving people information, but as a skill that is honed over time—one that is practised if and when changes happen in one's life.

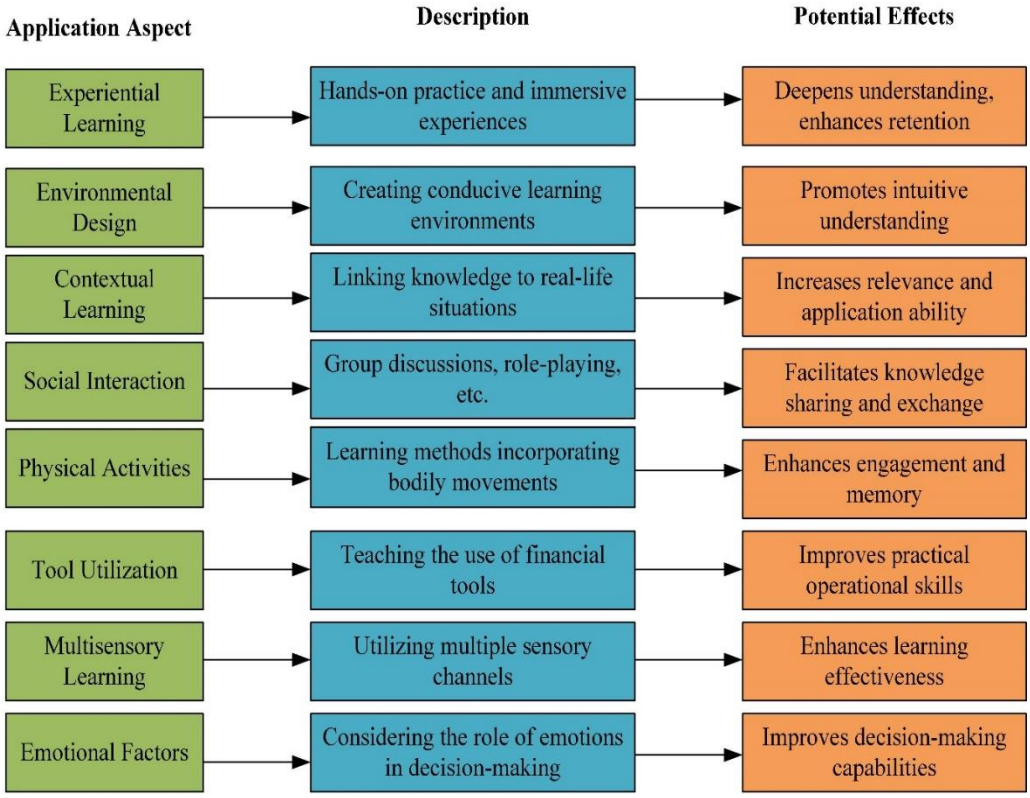

Figure 1: Main applications of embodied cognition theory in rural financial literacy education

Theoretical Implications for Rural Financial Literacy Pedagogy that Stem from Embodied Cognition Theory

The application of embodied cognition theory in financial education, when combined with other theories, might make teaching strategies more appealing to a rural Chinese audience and change their existing habits (Wang and Zheng 2018). Furthermore, this intervention can not only significantly enhance learning attainment but also enable the rural population to internalise and use financial understanding in their day-to-day lives. Providing financial education for rural residents of China through these features can effectively solve many of the constraints mentioned in this article.

1. By using embodied cognition theory in financial education, we can work around the usual problems caused by lack of infrastructure in rural areas. This teaching method actually helps people learn more effectively despite having access to fewer educational resources than traditional teaching methods would require.

2. The focus is designed around sound pedagogical principles that emphasise an active, experiential learning approach rather than a passive lecture-based instruction.

3. It addresses contextual challenges—linking financial knowledge with reality for rural inhabitants.

4. It facilitates systemic change incorporating an applied learning cycle that can respond to changing financial environments.

This integration seeks to improve financial literacy, decision-making ability, and quality of life for the rural populations by addressing their specific challenges and requirements in the evolving financial landscape of China (Chen et al. 2020; Moscarola and Kalwij 2021).

Procedure of Learning Innovative Finance by Using Embodied Cognition

The addition of the embodied cognition theory based in financial education has brought a new paradigm and different points of view and methods to a novel pedagogical process (Stern 2015; Weiskopf 2010). As shown in Table 1, this step includes four main stages: financial daily social observation, operation practice, concept explanation and summary, and application training. Each phase is carefully created to be in line with the tenets of embodied cognition theory and designed to better rural residents' conception of and capacity for financial knowledge through actual experience, context interaction, and social communication (Larkin, Eatough, and Osborn 2011; Varga 2014).

The first layer, dedicated to monitoring everyday financial activities, is a crucial groundwork. Efforts are made to connect abstract financial terms received in the class to the practical aspects of life that students experience on a daily basis (Hardcastle 2020). This phase will guide participants on known financial activities or routine transactions of personal/family life, such as shopping, saving, and borrowing. In addition, it provides a more concrete and lived experience of the financial ecosystem, as all students are taken on organised field visits to nearby financial institutions such as village banks or rural credit unions. Investigating the money in local economic activities, for example how prices of agricultural products operate and why an increase or decrease in income must manifest as correlatively deeper debt or reduced spending across a seasonal cycle, gives enough substrate for learners to create real associations between abstract finance and reality. This approach capitalises on learners' real-world tactile life experiences and environmental touch-and-feel interactions, translating finance learning concepts from abstract to concrete and meaningful, making for easier understanding and application (Wasner et al. 2014).

The second stage, focused on practical exercises, is an example of the classic "learning by doing" in terms of embodied cognition theory (Ballard et al. 2013). In this stage, learners perform roles such as opening a bank account or applying for a micro loan in a simulated environment of financial transaction. They convert and de-abstract financial concepts into experiences through physical or play money exercises on budget management, using smartphone applications for simple investment or financial planning simulations (Kaiser and Menkhoff 2022). Rather than simply being more interesting,

this method not only allows for better understanding but also strengthens memory (even the ability to transfer and apply the skills learned in the real world). This direct, hands-on involvement leads the learners to have a visceral experience and an understanding of the real-world actions involving financial concepts (DeHart et al. 2016).

The next stage (conceptual explanation and summary) is very important, as it focuses on the vital process of moving from physical or concrete operations to a systematic level or abstract knowledge (Hotton and Yoshimi 2011). Group discussion is a part of this phase where learners tell each other what they have learned by observing and through practical work. This stage makes use of images such as diagrams and maps for financial concepts that help learners form an integrated mental image about the concept. Helping learners describe financial ideas using their own words and applying them to everyday situations move the learners from concrete to abstract while fuelling real-world understandings. The corresponding social interactions associated with such discussions and sharing sessions support a stronger grounding of knowledge in experience, highlighting the ubiquitous nature of sociocultural processes in cognitive development as hypothesised by embodied cognition theory (Finn et al. 2014).

The last phase is focused on training and implementation, which relate to embodiment cognition theory with reference to environmental interaction (Richeimer 2017). This sees students creating evidence-based financial-decision exercises that mirror life, for example, a complete family financial plan. Interactive exercises through role-play allow students to practise a wide spectrum of fiscal scenarios that are close to real life, for example, loan discussions with bankers. Supporting the everyday practice and critique of what has been learned by relating it to the real world makes learning more continuous and processual in the environmental context (Boyd and Diez-Amigo 2023). Imparting knowledge in real or pseudo-real environment areas also supports learning as well as develops practical problem-solving skills.

This novel pedagogical approach both ties clear theoretical anchors to embodied cognition and provides a systematic process for embodying learning practices. It stresses the role of facilitating “learning by doing” and a complex adaptive system made of informal physical experiences, environmental readings, and social exchanges that turn abstract financial aspects into meaningful knowledge (Hong Shan, Cheah, and Leong 2023). Focusing on the requirements of people and their living environments, such as in rural areas, boosts the effectiveness of financial education as it becomes an interactive process rather than a simple transmission of knowledge. By increasing financial literacy and the ability to apply knowledge on the subject in daily life, this methodology not only improves learning outcomes but also increases the capacity of rural residents to use financial information for decision-making, therefore improving quality of life (Brugiavini et al. 2020). This innovative pedagogical model brings in a paradigm shift in rural finance pedagogy that could significantly enhance the levels of financial literacy among rural populations.

Table 1: Innovative financial education process based on embodied cognition theory

Stage	Specific Implementation Methods	Theoretical Support
1. Observation of Daily Financial Activities	• Record personal/family daily economic activities • Field visits to local financial institutions • Analyse financial elements in local economic activities	• Connecting abstract concepts with daily experiences • Utilising existing bodily experiences and environmental interactions • Establishing links between concrete situations and financial knowledge
2. Practical Operation	• Simulate financial transaction scenarios • Use real/simulated currency for budget management • Operate financial apps for investment/financial planning simulation	• Core concept of "learning by doing" • Deepening understanding through physical participation • Transforming abstract concepts into concrete experiences
3. Concept Explanation and Summary	• Group discussions to share experiences • Use visualisation tools to organise concepts • Explain financial concepts in own words	• Converting concrete experiences into abstract concepts • Deepening understanding through social interaction • Building a systematic knowledge framework
4. Training and Application	• Financial decision-making exercises based on real scenarios • Role-playing to simulate financial situations • Practice and feedback in daily life	• Emphasising the importance of environmental interaction • Applying knowledge in real situations • Developing practical problem-solving skills

Models for Teaching Innovative Finance Using Embodied Cognition

The application of embodied cognition theory in financial education represents a significant shift for rural populations, making financial literacy more tangible and accessible (Galetzka 2017; Tibbetts 2014). This model, grounded in embodied cognition (Gärtner 2013), reflects rural daily life through key components such as: body metaphor mapping, which uses common objects to explain complex financial concepts (Brouillet et al. 2010a); inculturation, integrating curricula with rural economic activities (Walstad et al. 2017); contextual interaction, promoting simulated and real financial environments (Schilhab 2017; Wilson 2013); deliberate practice, encouraging analysis of daily financial activities (Carlin and Robinson 2012); and embodied teaching

methods, incorporating role-playing and physical props (Brouillet et al. 2010b). The instructional process follows fieldwork, practice (see Table 2), theory and synthesis, and applied training phases, with diverse and realistic assessment methods (Netemeyer et al. 2024). Emphasising educator training and integrating modern technology, this model transforms financial education from mere knowledge transfer to experiential learning. By doing so, it has the potential to significantly impact rural economic development and empowerment in China, improving financial literacy, decision-making capacity, and overall prosperity.

Table 2: Innovative financial education model based on embodied cognition theory

Strategic Aspect	**Specific Measures**	**Theoretical Support**
1. Body Metaphor Mapping	• Use "piggy bank" to metaphorise savings accounts • Use "slicing a cake" to metaphorise asset allocation • Design physical activities to experience financial risks	• Utilise familiar bodily experiences to understand abstract concepts • Deepen understanding through concrete experiences
2. Respect for Daily Economic Experiences	• Design teaching content based on planting, breeding, microloans, etc. • Collect and analyse common rural financial cases	• Connect learning content with real-life experiences • Enhance relevance and practicality of learning content
3. Emphasis on Body-Environment Interaction	• Create simulated rural financial scenarios • Organise field trips to financial institutions	• Emphasise the importance of environment in learning • Deepen understanding through direct interaction
4. Practical Reflection	• Encourage recording and analysing daily income and expenses • Set up group financial planning projects	• Highlight the role of experiential reflection in learning • Cultivate practical application skills
5. Embodied Teaching Process	• Role-play financial transaction scenarios • Use physical props for operations	• Emphasise the importance of bodily participation in learning • Deepen understanding through multi-sensory experiences
6. Embodied Teaching Environment	• Set up a "Village Financial Corner" • Use mobile devices to create virtual financial environments	• Create immersive learning experiences • Provide opportunities for learning anytime, anywhere

7. Innovative Teaching Process	a. Observe daily financial activities b. Practical operation c. Conceptual explanation and summary d. Training and application	• Complete learning cycle from concrete experience to abstract concept to application • Emphasise cyclical and progressive learning process
8. Assessment Methods	• Diverse assessment: practical operations, case analysis, scenario simulations • Focus on process-oriented evaluation	• Comprehensively evaluate learning effectiveness • Focus on practical application abilities
9. Educator Training	• Conduct training on embodied cognition theory and rural financial knowledge • Encourage in-depth understanding of local financial ecosystems in rural areas	• Ensure educators can effectively implement new teaching models • Enhance the relevance of teaching
10. Technical Support	• Develop financial education apps/mini-programmes suitable for rural residents • Use virtual reality/ augmented reality (VR/AR) technology to create immersive learning experiences	• Leverage modern technology to enhance learning effects • Provide diverse learning channels

Pilot Study in Guangdong Province

We implemented a six-month pilot programme in a rural community in Guangdong Province, specifically in the Shantou City area. This region was selected for its diverse agricultural activities, primarily rice cultivation and pig farming, which provided a rich context for applying financial literacy concepts to real-world agricultural scenarios. Guangdong Province, while known for its industrial and technological advancements, still has significant rural areas where traditional farming practices co-exist with emerging modern agricultural techniques. This unique blend made it an ideal location to test our embodied cognition-based approach to financial literacy education. The community we worked with consisted of approximately 200 households, with farming as the primary source of income for most families. Prior to our intervention, a needs assessment revealed that while many farmers had basic numeracy skills, their understanding of formal financial concepts and services was limited. Many relied on informal lending networks and had little interaction with formal banking systems.

Table 3 provides a concise overview of the programme's implementation, outlining the main phases, components, durations, and key activities. It offers a quick reference guide for the entire financial literacy education initiative based on embodied cognition theory.

Table 3: Financial literacy education initiative based on embodied cognition theory

Phase	Component	Duration	Key Activities
1. Preparation	1.1 Curriculum Development	1 month	Design lesson plans; Create props and aids; Develop role-playing scenarios
	1.2 Trainer Preparation		Train agricultural extension officers; Familiarise trainers with curriculum
	1.3 Participant Recruitment		Select 50 farmers; Conduct baseline assessment; Survey learning goals
	1.4 Logistics		Secure venue; Arrange transportation; Procure materials
2. Core Programme	2.1 Weekly Workshops	5 months	20 sessions, 3 hours each; Use local products for exercises; Employ physical metaphors
	2.2 Monthly Field Trips		5 trips to banks, markets, farms; Practice with ATMs and apps; Meet financial advisors
	2.3 Role-Playing Scenarios		10 sessions; Simulate loans, insurance scenarios; Enact financial decision-making
	2.4 Personal Finance Journalling		Weekly logs of finances; Regular reflection exercises
	2.5 Peer Learning Groups		Form small groups; Encourage knowledge sharing
3. Technology Integration	3.1 Mobile App Usage	Ongoing	Introduce farm management apps; Practice with mobile banking

	3.2 Online Resources		Create programme website; Establish social media group
4. Continuous Assessment	4.1 Regular Feedback	Monthly	Surveys after each workshop; Monthly focus group discussions
	4.2 Progress Tracking		Monthly mini-assessments; Review financial journals
	4.3 Curriculum Adjustment		Analyse feedback data; Make real-time adjustments
5. Conclusion and Evaluation	5.1 Final Assessment	1 month	Comprehensive literacy assessment; Compare with baseline
	5.2 Practical Application Evaluation		Review financial decisions; Assess adoption of services
	5.3 Community Presentation		Organise showcase event; Invite local institutions
	5.4 Long-term Follow-up Plan		Schedule periodic check-ins; Create ongoing support mechanism

The financial literacy scores of participants showed substantial improvements across all three measured areas over the six-month programme (see Figure 2). Basic Financial Knowledge saw the quickest initial gain, jumping from 45% to 58% in the first two months, before tapering off to a final score of 78%. Advanced Financial Concepts, despite starting at the lowest baseline of 22%, demonstrated the most significant overall growth, steadily increasing to 61% by the programme's end. This represents the highest relative improvement among the three categories. Practical Application Skills also showed consistent progress, rising from 38% to 72%, with the most substantial gains occurring in the middle of the programme. These results indicate that participants not only grasped fundamental concepts quickly but also successfully tackled more complex financial ideas and improved their ability to apply this knowledge practically. The varying patterns of improvement across these areas suggest that the programme effectively addressed different aspects of financial literacy, from basic understanding to advanced concepts and real-world application.

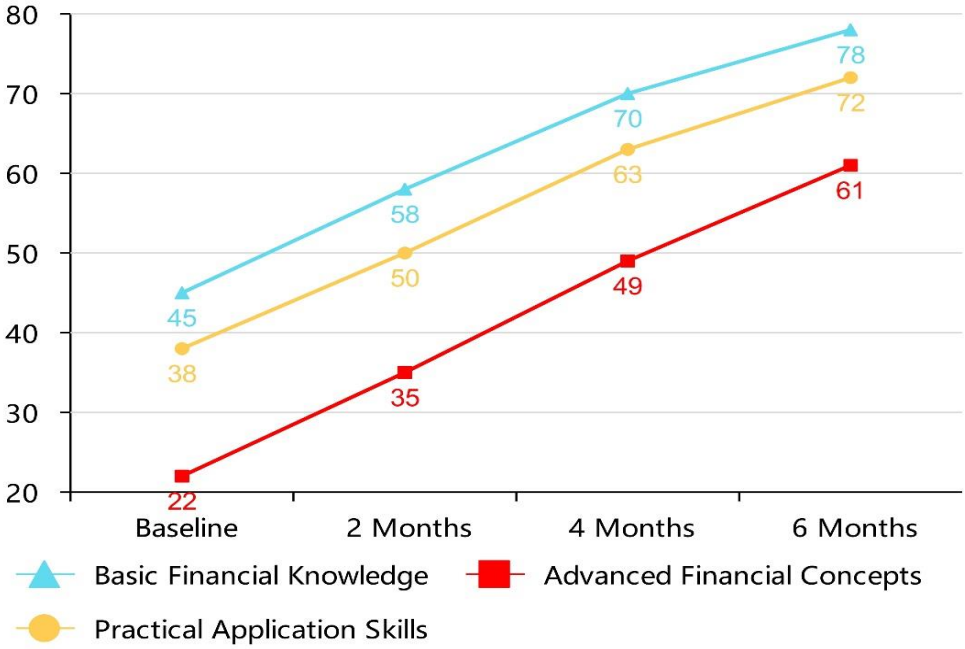

Figure 2: Change in financial literacy score

The data in Figure 3 demonstrates significant positive changes in participants' financial behaviours over the six-month programme. The most dramatic improvement was seen in the use of formal banking services, which nearly tripled from 30% at baseline to 85% by the programme's end. This suggests a substantial shift in participants' trust and engagement with the formal financial sector. Regular budgeting practices also saw a notable increase, from 15% to 70%, indicating a growing commitment to financial planning among participants. The savings rate, while showing the smallest absolute increase (from 5% to 15%), actually tripled over the course of the programme, representing a significant change in financial habits. Use of agricultural insurance grew steadily, increasing from 10% to 45%, which could indicate an improved understanding of risk management in farming.

Interestingly, different behaviours showed varying rates of change. The adoption of formal banking services and regular budgeting practices accelerated in the middle of the programme (between 2–4 months), suggesting that these behaviours might require some time and familiarity before being widely adopted. In contrast, savings rates and use of agricultural insurance showed more gradual, steady increases throughout the programme. These changes collectively point to a substantial improvement in financial behaviours, with participants becoming more engaged with formal financial services, more proactive in financial planning, and more aware of the importance of savings and risk management in their agricultural operations.

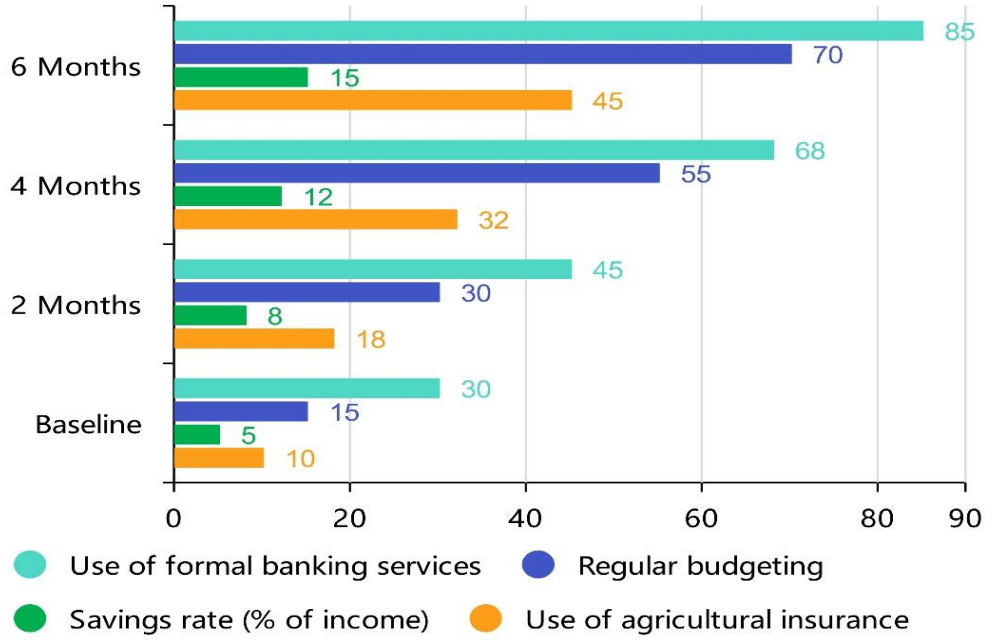

Figure 3: Financial behaviour changes

The data in Figure 4 illustrates a significant increase in technology adoption among participants over the six-month programme. Mobile banking app usage saw the most dramatic growth, more than tripling from 20% at baseline to 75% by the end of the programme. This rapid adoption suggests that participants quickly recognised the value and convenience of mobile banking in their daily financial activities. Farm management app usage, while starting from a lower baseline of 5%, showed impressive growth, reaching 40% by the end of the programme. The acceleration in later stages indicates that as participants became more comfortable with technology in general, they were more willing to apply it to their agricultural practices. Access to online financial resources also saw substantial improvement, increasing from 15% to 60%. This steady growth across all stages of the programme suggests a gradual but consistent increase in digital literacy and comfort with online tools.

Notably, all three technologies showed different adoption patterns:

1. Mobile banking had the steepest initial adoption curve, possibly due to its immediate practical benefits.

2. Farm management apps had a slower start, but showed accelerating adoption in later stages.

3. Online financial resource access increased at a steady rate throughout the programme.

These varied patterns might reflect differences in the perceived utility, ease of use, or relevance of each technology to the participants' daily lives and work. The overall trend across all three areas indicates a significant shift towards digital tool usage, which could have far-reaching implications for the participants' financial management and agricultural practices.

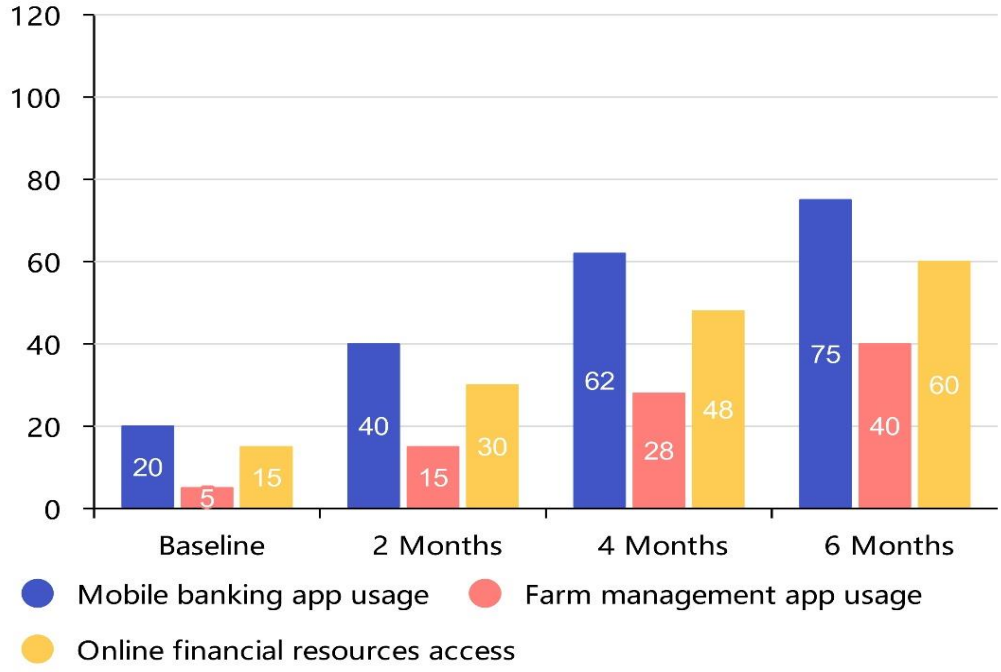

Figure 4: Technology adoption

Discussion and Conclusion

The application of embodied cognition theory to financial literacy education for Chinese rural residents represents a significant advancement in both theoretical innovation and practical application (Hellmann, Echterhoff, and Thoben 2013). This approach not only enhances the effectiveness of rural financial education but also contributes to the comprehensive development of the rural economy.

From a theoretical perspective, the integration of embodied cognition theory into rural financial education offers a novel framework for addressing the current challenges in this field (Hukkinen 2014). Traditional financial education methods have often failed to consider the lived experiences and cognitive characteristics of rural residents, resulting in suboptimal educational outcomes. By leveraging embodied cognition theory, we can re-examine how rural residents comprehend and internalise financial knowledge, enabling the design of educational strategies that align more closely with their cognitive processes. This theoretical innovation not only propels the advancement of rural financial education but also provides a valuable model for rural education in other domains.

In terms of practical application, this study demonstrates the potential for direct improvement in the efficacy of rural financial education (Dare et al. 2020). The development of teaching strategies grounded in embodied cognition theory allows for the creation of educational methods that resonate with the daily realities of rural life. For instance, utilising agricultural production processes to elucidate financial concepts or simulating rural scenarios for financial decision-making practice can significantly enhance engagement and comprehension among rural learners. As the effectiveness of education improves, the financial literacy of rural residents is expected to rise substantially, yielding positive impacts on their financial management capabilities and overall quality of life.

The implications of this research extend beyond education to rural economic development. Enhanced financial literacy among rural residents is a crucial factor in driving rural economic growth. Financially literate individuals are better equipped to manage personal and family finances, make informed investment decisions, and effectively utilise financial instruments to support agricultural production and entrepreneurial activities. This improved financial acumen can lead to more widespread use of modern financial tools for risk management, such as agricultural insurance or futures contracts, contributing to the stabilisation of farm incomes. Moreover, financially savvy rural residents are more likely to engage in diverse economic activities, including local enterprise investments and co-operative participation, which are vital for the diversification and robustness of the rural economy.

From a social equity perspective, this study contributes to narrowing the urban-rural divide in financial literacy and promoting financial inclusion. By enhancing financial education methods and elevating the financial literacy of rural residents, we can empower them to more fully participate in the modern financial system and benefit from financial development, thereby fostering more balanced urban-rural development.

The findings of this research offer valuable insights for policymakers in formulating rural financial education policies. A deeper understanding of the financial education needs and cognitive characteristics of rural residents enables the development of more targeted and effective policy measures. For example, educational methods based on

embodied cognition theory could be incorporated into rural financial literacy programmes, and these insights could inform the service design of rural financial institutions.

In the context of long-term development, improving the financial literacy of rural residents aligns with the broader strategy of rural revitalisation. Enhanced financial literacy not only benefits individual financial management but also stimulates the development of rural financial markets and attracts more financial resources to rural areas. This has cascading positive effects on rural industrial upgrading, infrastructure improvement, and income elevation.

Methodologically, this study presents a new paradigm for rural education research (Will et al. 2020). The application of embodied cognition theory to rural financial education opens up avenues for developing research methods tailored to rural characteristics. This approach has potential applications beyond financial education, offering valuable insights for research in areas such as agricultural technology dissemination and health education.

In conclusion, this research on teaching strategies for financial literacy among rural residents, grounded in embodied cognition theory, holds multifaceted significance. It not only directly enhances the effectiveness of rural financial education but also catalyses overall rural economic development through improved financial literacy. The outcomes of this study have far-reaching implications for theoretical advancement, practical application, and policy formulation, making a substantial contribution to rural revitalisation and balanced urban-rural development. As we move forward, the integration of embodied cognition principles in financial literacy education promises to be a powerful tool in empowering rural communities and fostering sustainable economic growth in China's rural areas.

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