

The Impact and Future of Edible Landscape on Sustainable Development of Universities: A Systematic Literature Review

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Abstract

Food security and sustainable development have always been the focus of interdisciplinary attention. This is not only a local issue, but also a global problem. Universities play an important role in promoting sustainable development of cities and communities, and face increasingly important challenges in balancing ecological sustainability. Therefore, this article provides a systematic review through PRISMA. Elaborate from three perspectives: ecological benefits, social benefits, and educational benefits. Research has shown that introducing edible landscapes can improve campus sustainability, educational content, and community engagement. The motivation for this study stems from the urgent need for food security and ecological sustainability. With the continuous growth of global population and the acceleration of urbanization, university campuses, as core areas of knowledge and innovation, can play a demonstrative role in sustainable development. The contribution of this study is to systematically analyze the multiple benefits of edible landscapes in university campuses, providing scientific basis for universities to create sustainable development environments.

Introducing edible landscapes not only helps to improve the ecological diversity and environmental quality of campuses, but also enhances the awareness and participation of teachers and students in sustainable development, promotes community identity and social cohesion. Through this study, we hope to provide practical guidance for university administrators and policy makers to promote the practice of edible landscapes on a broader scale, thereby promoting the overall sustainable development of cities and communities.

Keywords: Edible Landscape, Sustainable Development, University Campus

Introduction

The rapid expansion of global urbanization and rapid population growth have led to frequent extreme weather events caused by climate change. It is expected that about 10% of agricultural land will not be able to continue cultivation in the future (Nandwani, 2018). In addition, the continuous expansion of cities into surrounding areas can also affect the level of agricultural development, leading to an increasingly distant relationship between cities and agricultural landscapes. Ecological environment, food crisis, and public health issues have become the focus of attention in this century (Haughton and Hunter, 2004).

At the same time, there are also some natural and human factors that have an impact on food security, such as natural disasters and excessive use of fertilizers, as well as improper farming practices leading to soil degradation and land depletion (Romagnoli and Fanelli, 2019). Since the outbreak of COVID-19, trade interruption between many countries has hindered economic development and exacerbated the global food shortage. Although the impact of the epidemic on the agricultural industry is relatively small, indirect negative conditions such as labor shortages, transportation disruptions, and export restrictions have disrupted the global food supply chain, ultimately leading to food waste and losses (Beltrami, 2020).

Urban agriculture is considered an important strategy for achieving sustainable urban development. Utilize abandoned or underutilized public or semi-public land to create production spaces for planting landscape plants and edible crops. This type of urban agriculture includes a range of edible spaces, such as rooftop gardens, community gardens, urban parks, etc (Cretella and Buenger, 2016). As a globally popular agricultural landscape model, various forms of agricultural activities exist between urban centers and surrounding areas (Graefe et al., 2019). It initially existed and developed in the southern regions of the world for a long time, but now the revival of urban agriculture is smoothly unfolding in cities in the north of the world (Tornaghi, 2014). Urban agriculture plays an important role in improving food security, ecological environment, mental health, community construction, and education. The economic and environmental value it generates far exceeds its scale. Research has shown that urban agriculture has a positive impact on food security and nutrition in developing countries (Jongw, 2014). It can also generate various social, economic, and environmental benefits, including commercialization and sustainable development. Community development and educational opportunities (Clinton et al., 2018).

In recent years, the theoretical research on edible landscapes has developed rapidly, but current related studies have shown that edible landscapes are widely used in urban residential areas and public areas (parks, squares, streets). However, these places are relatively difficult to manage due to high personnel freedom. In contrast, as educational institutions, universities have the advantages of relatively centralized and standardized

management, making it relatively easy for users such as students and faculty to manage. Through in-depth analysis, its potential and future development direction for the sustainable development of universities can be revealed, providing theoretical and practical support for promoting campus greening and ecological construction. Edible university landscape can strengthen teaching and research activities, reduce negative emotions, and produce fresh and delicious fruits and vegetables during the isolation of COVID-19 to realize the construction and development of ecological, healthy and efficient campus landscape, which is an edible and diversified campus landscape (Zhou et al., 2022). In order to find a feasible path for sustainable campus landscape and construct related research questions, the PICOS framework is used to design the questions to ensure the clarity and effectiveness of the research.

Therefore, this study aims to provide a comprehensive, systematic, and comprehensive literature review on edible landscapes. Based on these elements, it attempts to answer the following three questions: these questions will contribute to in-depth research on the role of edible landscapes in university environments, as well as their potential contributions to sustainable development goals and future development directions:

1. Can introducing edible landscapes in university communities promote sustainable development?
2. What are the specific impacts of edible landscapes on the ecological, social, and educational benefits of universities?
3. How to design and implement edible landscapes to maximize the sustainable development of universities?

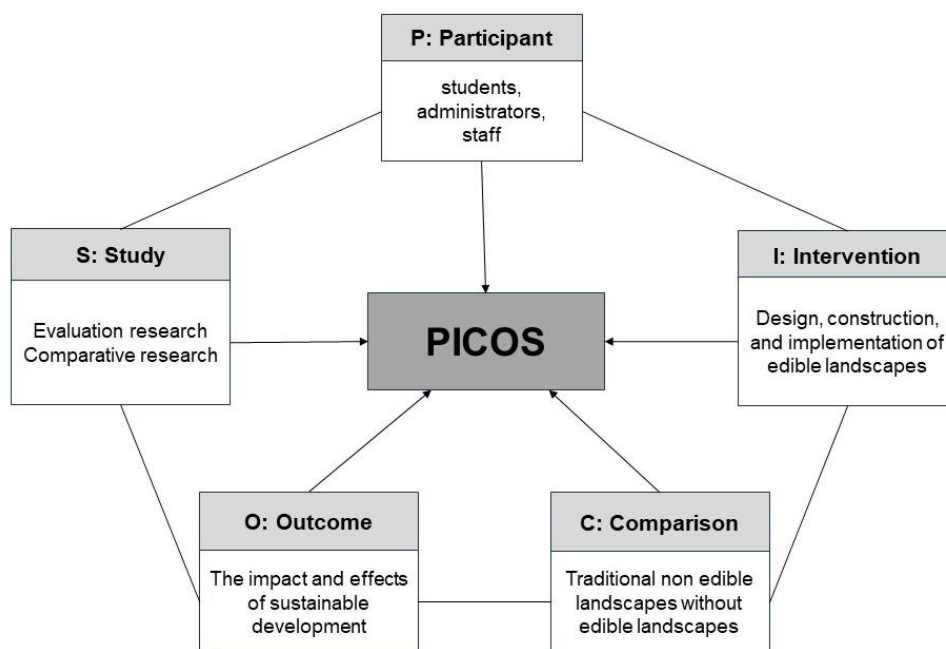


Figure 1. PICOS research question framework.

Literature Review

"Sustainable development" has already become the mainstream development trend of the current era. As a base for knowledge transformation, talent cultivation, and technological innovation, universities are of great significance in promoting the sustainable construction of

campus ecology and leading the sustainable development of the entire society (Freedenfelds et al., 2018). Establishing a cooperative and win-win relationship with society to help promote sustainable development. To achieve this goal, three future university models have been proposed: social, environmental, and economic. This will lead to universities potentially moving towards a hybrid development of multiple modes, ultimately contributing to sustainable development (Beynaghi et al., 2016). The traditional concept of treating university campuses as mere venues for knowledge dissemination has extended to the vision of social sustainability as a whole. In this sense, universities should contribute to sustainability through actions such as education, research, and communication (Beynaghi et al., 2016). Mahayudin et al. argue that the concept of edible landscapes needs to be combined with the complexity of nature, restoring damaged ecosystems, increasing biodiversity, promoting human health, providing safe livelihoods, and campus aesthetics (Diaz et al., 2021).

"Edible Campus" aims to provide students with fresh food through urban agriculture, thereby improving the sustainability of the campus. Urban agriculture has improved food security, nutrition, and urban biodiversity (Veenhuizen, 2006). Turning the campus into a farm for students to cultivate and maintain helps them explore themselves and strengthen their connection with the natural environment (Grichting et al., 2014). As a new interactive landscape model that combines agricultural production with landscape design. Applying it to the landscape of university campuses has multiple functions of inheriting agricultural culture, landscape design, and labor education. Universities establish connections, advocate for an ecological centered worldview, and spread a love for nature on campus, changing the world by changing the mindset of students (Coman and Jacob, 2023). Edible landscapes can be designed in various forms and scales, bringing enormous benefits to campus users (Lovell, 2010).

The University of Florida (UWF) in the United States has a student managed food storage room called Argo Pantry, which integrates plants that can be produced and used to obtain food and rich landscape effects. It can not only meet the daily needs of teachers and students, but also solve food security issues. Its existence helps to continuously disseminate available landscapes, ultimately ensuring food safety on university campuses (Adamson, 2021). The University of Minnesota at Duluth (UMD) has 16 campus gardens that not only encourage healthy eating, but also provide students and faculty with opportunities to learn about local agricultural products and fresh vegetables for the UMD community. UMD Facility Management Company makes edible garden projects possible through its commitment to sustainable development and alternative landscapes (Bluhm, 2012)

Through a survey, edible campus landscapes provide a wide range of advantages and contribute to sustainable social development, which have gradually been recognized by campus users (Lee et al., 2019). Fully utilize limited space through humanized design and educational inheritance. Provide multi-level services for teachers, students, and surrounding residents to meet the needs of environmental beautification, while promoting sustainable agricultural education and cultural heritage. Li (2014) incorporating edible plants into traditional landscape design can enhance the green health, ecological beauty, and economic benefits of gardens by adding unique ornamental elements (Creasy, 2010).

A survey shows that sustainable development education in universities has increased the motivation level of about 18% of students and knowledge and awareness by 27.7%. These research findings can be used to develop environmentally sustainable practices that students identify with (Ribeiro et al., 2021). Due to limited exposure to nature, their environmental awareness and physical and mental health may be affected. The concept of "edible campus" aims to help students better understand ecological nature and healthy food. By planting plants, integrating food and biodiversity from different fields into students' daily lives, cultivating more comprehensive environmental awareness and sustainable lifestyles. Fischer et al (2019) Through data surveys conducted during the epidemic, community gardens have been proven to be important places to make new friends and enjoy leisure time. Therefore, introducing edible landscapes in universities can enhance campus viewing and interaction. According to Ribeiro's (2021) research suggests that university sustainable development communication strategies can help enhance students' awareness and importance of sustainable development (Ribeiro et al., 2021)

An evaluation index for changes during the lockdown period indicates that the pandemic has significantly increased the sustainability contribution of students, but has had a negative impact on their physical and mental health and safety (Yip et al., 2022). Recent studies have shown that participating in planting activities can effectively alleviate the stress caused by pandemics and help promote mental health. Integrating edible landscape resources not only lays the foundation for a safer and stronger food system, but also provides people with rich experiences, including culture, art, entertainment, and social interaction (Theodorou et al., 2021).

Research has shown that establishing interaction with nature is beneficial for promoting health and environmental behavior. Research has shown that direct contact, emotional integration, cultural significance, and visual aesthetics can enhance the connection with nature. The loss of interaction with nature not only reduces the broad benefits related to health and well-being, but also hinders positive emotions, attitudes, and behaviors related to the environment, which means a cycle of dissatisfaction with nature. This is enough to demonstrate the importance of rebuilding the connection between humans and nature (Soga & Gaston, 2016). Taste the fresh and delicious ripe fruits and vegetables grown by oneself outside, plant some unusual varieties that are difficult to find in the market, interact with nature, and have fun (Beck and Quigley, 2001).

Speak et al. proposed the Healthy Academic Green Space Framework (HAGF), which views campus green space as a place to promote recovery, entertainment, interaction, and activities, thereby enhancing student happiness. Research has shown that campus green spaces are beneficial for the mental health of both students and faculty, and are associated with improving teaching quality and research funding availability (Fischer et al., 2019). In addition to identity and image, campus gardens have positive impacts on both social and psychological aspects (Lumber et al., 2017). Edible landscapes provide opportunities for people of all ages to socialize, entertain, relieve stress, and exercise (Çelik, 2017). The survey shows that schools play an important role in cultivating environmental sustainability awareness, and teachers and students have expressed more opportunities to understand the use and impact of edible landscapes in ecologically sustainable environments. These findings contribute to the development of campuses as important resources for urban green spaces,

increasing interaction between teachers and students and the campus environment (Akoumianaki-Ioannidou et al., 2016).

Krasny and Delia (2015) pointed out that sustainable development methods on campuses often focus more on measures to reduce gas emissions and waste disposal, and less on cultivating student participation in campus landscape natural space management (Bogeld, et al., 2018). The implementation of edible landscapes on campus should avoid other informal community horticultural models as much as possible, such as lack of systematic management, neglect of public infrastructure construction, and neglect of diverse living needs of users, including personal emotional expression and social activities, ensuring food quality, and controlling expenses (Baojie He and Jin Zhu, 2018). Not all edible landscapes are suitable. For example, whether the food grown has safety hazards needs to be considered. We should follow the principles of environmental friendliness and organic cultivation. To fully leverage the multifunctionality and value of edible landscapes, including their ornamental, practical, and popular science education, and achieve a synergistic effect of multiple functions (Lin et al., 2022).

There are many universities implementing campus agriculture, and it is expected to increase. However, empirical research on agricultural basic learning in higher education is limited (LaCharite, 2016). Although an edible campus only represents a specific place, it is a community place that can be replicated to other similar locations. This is an appropriate model for transforming cities, while also providing additional benefits. As a microcosm of the entire society, universities require lower costs in terms of human, material, and financial resources, and the success of campus small projects can reflect how the entire society weaves edible landscapes into urban space without reducing their utility, function, or appearance (Bhatt et al., 2009).

Research Methodology

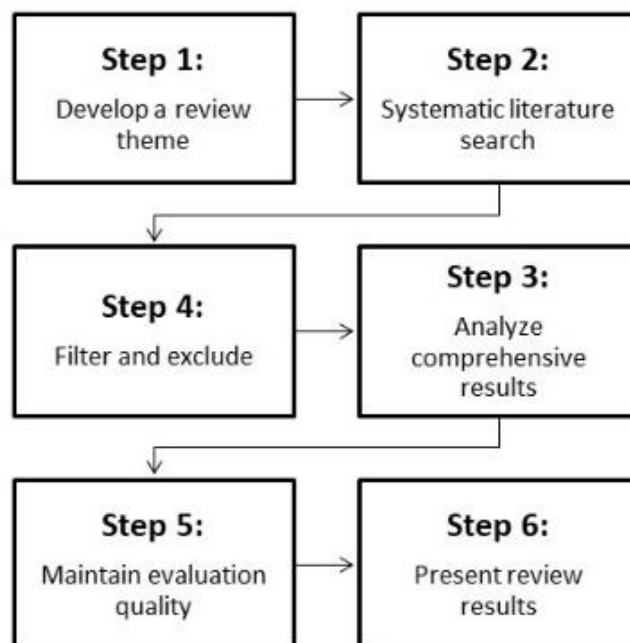


Figure 2. Phases of systematic review.

This article adopts the PRISMA research method and visualizes the entire process of literature selection and inclusion through a flowchart to guide researchers on how to report the selection, inclusion, exclusion, and data analysis process of the study. The specific steps include:

Search Source

A systematic literature review on the sustainable development of edible campus landscapes in universities, with "edible landscapes", "sustainable development", and "university campuses" as the main search keywords. We mainly searched for relevant literature from international academic databases such as Science Direct, Wiley, and Springer Link. The search is conducted by setting the search category to "topic" and the time to "2010-2024".

Screening Criteria

In order to ensure the quality of the article and avoid the impact of non-empirical research articles on the results, screening and qualification criteria have been established for the article. (1) Regarding the type of article, only journal articles are considered; (2) Only journal articles published in English are included; Non-English journal articles are excluded; (3) The scope of the article is edible landscapes. In terms of screening criteria, keywords such as "edible landscape", "university landscape", "urban agriculture", and "sustainable development" will serve as the basis for retrieval. The time frame will be limited to the next fifteen years to ensure that the review article covers the latest research findings.

In terms of language, only English literature is included to ensure coverage of the most authoritative and extensive research internationally. Rao et al (2020) found that 96.19% of research findings in international academic research papers over the past decade were published in English, while less than 4% were published in other languages. In terms of specific research objects and content, the focus is on universities and their edible campus landscape projects, with a focus on examining the current status of landscape design, edible plant species and adaptability, education and community participation, as well as sustainability and environmental benefits. The exclusion criteria still include literature unrelated to Chinese universities, edible campus landscapes, and a lack of peer review. The modified search sources and screening criteria mentioned above will help ensure the authority and international relevance of the literature review, providing useful references for the research and practice of edible campus landscapes in Chinese universities.

Research results

Establishing an edible campus may not guarantee the needs of the entire city residents, but it can meet the needs of campus users and surrounding residents and achieve its economic benefits; Bringing edible landscapes into the campus and imparting knowledge of food and agricultural production to students; More importantly, teachers and students plant visible and edible fruits and vegetables on campus, enjoy interaction with the ecological environment, and shape the diversity of urban space (Zhou et al., 2023). Divide the ecological environment, food safety, social interaction, physical and mental health, educational value, and sense of belonging into three major parts: ecological benefits, social benefits, and economic benefits, in order to demonstrate the multifaceted impact of edible landscapes in universities.

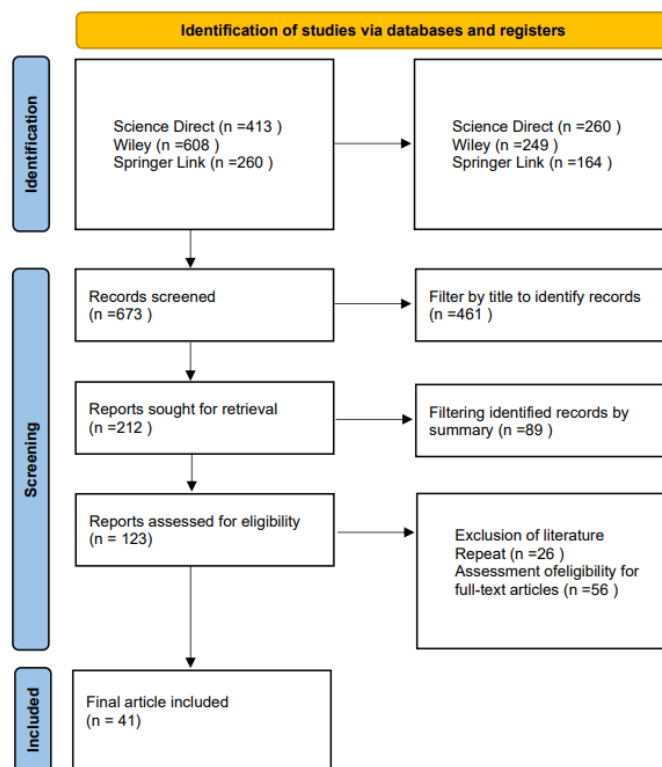


Figure 3. Article selection process.

Ecological Environment

Cities have been engaged in food production for a long time, especially in developed countries. Urban agriculture has improved food security and social welfare, but it is also accompanied by several limiting factors. Edible landscapes provide ecosystem services but require maintenance. It is a green infrastructure that utilizes edible crops to beautify space, which is beneficial for food security and social well-being (Mok et al., 2014).

The emergence of university towns not only promotes the rapid development of the higher education industry, but also greatly enhances the comprehensive strength of the region. However, with the deepening of the construction of the university town, its achievements have also exposed some problems that cannot be ignored. It has gradually realized the environmental problems of blind development of artificial landscapes in the region. However, the emergence of sustainable development ideas and the integration of landscape design theory and landscape ecology can alleviate and improve the environmental problems of university city landscapes, providing people with a new perspective (Zhu and Tan, 2013). Some universities propose to jointly apply production and landscape to the construction of the entire campus ecological landscape. Focus on the potential space for on-site food cultivation, provide convenient and healthy food for students and workers, and minimize the impact of transporting food on the environment. This approach emphasizes the concept of a "food blueprint" aimed at reducing consumption by recycling organic waste on campus and optimizing various resources through systematic thinking (Solder and Awwaad, 2015). In terms of ecological and environmental benefits, it is recommended to choose a central landscape and large space, establish a complete ecological connection, and reasonably allocate planting functions to increase the proportion of fruit trees and aquatic products.

Food Safety

Against the backdrop of the ongoing food crisis and constantly changing social dynamics, the concept of "edible landscapes" has received increasing attention. The design of edible landscapes requires the integration of food production with urban green spaces, providing a new approach to addressing food safety and environmental sustainability (Xiao et al., 2023). The activities of the food system are seen as a sustainable choice for agricultural ecological transition. A food security issue can expand the space for economic production and social benefits in campus communities and their surrounding areas, while alleviating ecological and environmental sustainability issues (Bohn and Chu, 2021).

The practice of integrating plants capable of producing food into landscape design fully leverages the aesthetic value and food production benefits of edible plants. Not only does it provide a healthy and fresh source of food, but it also enriches people's diverse diets. Meanwhile, planting plant varieties with unique colors or forms can better highlight aesthetic value (Sima et al., 2010). The creation of most edible landscapes is beneficial for enriching biodiversity, improving food security, and providing social and economic benefits (Zheng and Chou, 2023).

Table 1

The performance of ecological benefits.

| Influence | Performance |
|------------------------|---|
| Ecological Environment | Improve vegetation coverage |
| | Promoting biodiversity |
| | Reduce campus carbon emissions and ecological footprint |
| Food Safety | Campus self-sufficient food sources |
| | Reduce dependence on external food supply |
| | Improve food safety |

Social Interaction

Outdoor activities help to promote cultural and intellectual exchange between teachers and students in various colleges to the greatest extent possible, and can also greatly assist the teaching outcomes of traditional indoor classrooms. The classrooms of various departments and diverse open spaces increase opportunities for students to communicate with each other, which may promote cooperation and interdisciplinary communication. An active and visually appealing outdoor environment has a significant impact on the formation of a sense of community (Hanan, 2013). A well-structured campus can create a pleasant experience and encourage students to spend time studying and actively socializing with the natural environment (Hajrasouliha, 2017). Teachers believe that schools can play an important role in cultivating awareness of environmental sustainability, and both teachers and students express a desire to learn more about the use and impact of edible landscapes in ecologically sustainable environments. These findings contribute to the development of campuses as important resources for urban green spaces, increasing interaction between teachers and students and the campus environment (Akoumianaki-Ioannidou et al., 2016). In order to enhance the close connection between campus users and nature and food, and to create a gourmet campus around, everyone can share their own grown food with friends and teachers (Worden and Brown, 2007).

An edible garden can inspire campus teachers, students, and administrators, and enhance the image of the university. It fully utilizes campus green space to make the greatest contribution to sustainable development. To have an edible garden, all stakeholders need to work together. Universities can bring closer cooperation and win-win relationships between campus users and surrounding residents. (Muljono et al., 2020). Research has shown that green plants are a popular addition among students in university environments. They also hope that a green outdoor university environment can better alleviate physical and mental stress (Van Den Bogerd et al., 2018).

Physical and Mental Health

Campus landscape not only symbolizes identity and image, but also plays a regulating and soothing role in physical and mental health through campus construction (Lumber et al., 2017). More able to address the concerns surrounding key areas of physical and mental health (Niemtus, 2018). During the COVID-19 epidemic, people were restricted from shopping, and students had to rely on schools to distribute basic food. This situation has had a significant impact on the lives of students, leading to food shortages and increased psychological pressure. Edible landscapes to some extent alleviate the psychological pressure of students when facing these difficulties (Jin et al., 2022). An urbanized and livable campus provides students with a restorative environment where mental fatigue can be reduced, thereby promoting better academic performance. Students often feel fatigued when facing increasing direct attention pressure. A carefully designed campus can become a charming place for students to rest and enjoy college life (Hajrasouliha, 2017).

Table 2
The performance of social benefits

| Influence | Performance |
|----------------------------|--|
| Social Interaction | Places and topics for communication and interaction Enhancing the cohesion of campus communities Spirit of cooperation |
| Physical and mental health | Participate in planting and maintaining edible landscapes Enjoy outdoor activities and farming experiences Helps alleviate learning pressure Promoting physical and mental health |

Educational value

In any institution that can accommodate people for a long time, such as schools and hospitals, food control plays a particularly important role. Campus, as an educational venue with concentrated personnel, is also an important place for producing and consuming food, and should be integrated into education and curriculum (Burke, 2005). The educational value of edible landscapes is reflected in spreading agricultural culture, allowing students to experience the process of plant growth, cultivating a sense of happiness towards labor and life, and establishing a correct outlook on life. Creating edible landscapes is a way to achieve comprehensive education. Schools can enrich campus life by setting up edible gardens or landscapes, cultivate students' planting knowledge and teamwork awareness, and promote the improvement of comprehensive quality.

Sense of belonging

Campus green spaces promote mental health and cultivate a sense of belonging that may support academic success by evoking positive emotions such as happiness and energy. Campus landscape can help teachers and students alleviate the concentrated fatigue in their daily university work and life. This restorative effect is more pronounced among students. Promote mental health and evoke positive emotions. At the same time, it triggers a sense of social belonging. Conversely, a sense of social belonging may support academic success (Foellmer et al., 2021).

Relying on the natural and cultural resources and infrastructure of the campus, fully considering the habitat of edible plants, fully utilizing abandoned land to plant ornamental edible plants, and serving teachers and students. This will enhance the emotional identification of teachers and students. Combining the functions and values of campus edible landscapes, students are encouraged to participate in the planning, planting, cultivation, and harvesting of edible plants, and assist in the production of food. Students can also provide their own suggestions and ideas on the construction of campus edible landscapes. Throughout the process, students gained a sense of happiness, enhanced their sense of belonging and attachment to the university. Therefore, it helps to cultivate students' practical abilities and creates a good emotional effect through training (Lin et al., 2022).

Table 3

The performance of educational benefits

| Influence | Performance |
|---------------------|--|
| Educational Value | Knowledge and skills in agriculture and sustainable development Contribute to sustainable development in the future |
| Emotional Belonging | Emotional identification and sense of belonging Nature conservation awareness and sense of responsibility |

Discussion*The impact of edible landscapes on university construction*

As a sustainable design concept, edible landscapes have had multiple positive impacts on the construction of universities.

Firstly, promote campus greening in universities, improve the quality of the ecological environment, and bring a more pleasant atmosphere to the campus. Edible landscapes are the use of vegetables, fruits, and flowers to endow them with various functions, such as food, aroma, and aesthetics. It provides an alternative solution for traditional landscapes for community users to consume and appreciate. It can be independently planted or mixed with ornamental plants to form a unique landscape design (Fetouh, 2018).

These plants have comprehensive value, including aesthetic value, consumer value, and so on. Edible landscape refers to the actual combination of edible plants in a decorative or decorative environment. The use of edible food in landscape design can enhance the health, aesthetics, and economic benefits of gardens by providing a unique ornamental ingredient.

Secondly, promote community cooperation within the campus, enhance interaction and communication among campus users, and create a more harmonious campus atmosphere.

The design concept of campus landscape is a constituent element of green culture in university campuses. Creating an ecological campus in the layout of the campus environment is considered a development direction. Campus greening should be an important component of campus cultural construction, with the goal of environmental education. Create a beautiful, harmonious, and comfortable green space to meet the needs of teachers and students for learning, communication, entertainment, and shaping people's souls (Shu-Fan, 2006).

In addition, to enhance students' understanding and practice of sustainable lifestyles, cultivate their sense of environmental responsibility and sustainable development awareness. After the pandemic, cities need to be more resilient and sustainable to cope with various risks. The epidemic has disrupted people's lives, and remote work has increased social barriers, which may lead to mental health problems and feelings of loneliness. The survey shows that the COVID-19 epidemic may seriously affect people's mental health. After the pandemic, equal attention should be paid to people's spiritual needs. A new perspective recognizes that in addition to survival needs, attention should also be paid to culture, art, and social interaction. This new concept of connection emphasizes the importance of mental affairs (Theodorou et al., 2021).

Conclusions and Suggestions for Future Research

Research conclusions and recommendations for future research

Through a review and analysis of existing literature, the following conclusion can be drawn: Edible landscapes play an important role in the sustainable development of universities, but related research is still relatively scarce, and most of it focuses on case studies in specific regions or schools with smaller scales. In order to gain a more comprehensive understanding of the impact of edible landscapes on the sustainable development of universities, future research can be conducted from the following aspects:

One is to focus on the overall perspective of edible campus landscape design, including community interaction, food security policies, and educational inheritance, in order to promote sustainable development of universities.

In recent years, edible campus landscape design has gradually become a trend, emphasizing local design but lacking a comprehensive perspective. Under the concept of edible campus landscape, the aim is to integrate the botanical garden with the campus, and through humanized design and educational inheritance, fully utilize the narrow spatial environment to create a unique edible landscape. This design concept integrates agricultural technology demonstration, science popularization, and entertainment elements, providing multi-level services for teachers, students, and surrounding residents. Through such an edible campus landscape, not only does it meet the goal of environmental beautification, but it also provides sustainable agricultural education and cultural heritage for the community (Li, 2014).

Establishing a complete edible campus supply chain, including storage, processing, distribution, and retail, is a high cost and a significant issue. Therefore, the study suggests incorporating edible landscapes into food policies to address food security issues. In terms of education, urban agricultural policies have been implemented on school campuses, promoting the connection between food production and education. This includes strengthening community interaction, enhancing understanding of food and agriculture,

beautifying urban landscapes, and promoting diverse urban environments to form a holistic awareness (Zhou et al., 2022).

The second is to understand the long-term impact of the implementation of edible landscapes on campus ecological environment, community interaction, and sustainable lifestyles of students; Pay attention to the safety and multifunctionality of urban agricultural products, and promote the sustainable development of edible landscapes on a global scale. The sustained growth of the global population will not diminish the economic and social importance of urban agriculture, as long as governments recognize the multifunctionality of urban agriculture and ensure the safety of its products and environment.

Starting from reality, universities should adapt to local conditions, strengthen planning, and establish a participatory campus food landscape. By utilizing natural and cultural resources as well as campus infrastructure, it is necessary to fully utilize abandoned land to plant ornamental and edible plants, and cultivate the emotional identity of teachers and students. Integrating students into the planning, planting, nurturing, and harvesting processes, as well as participating in food production, can enhance their sense of happiness, strengthen their connection with universities, cultivate practical skills, and foster positive emotional influence, thereby helping to create a unique university brand (Lin et al., 2022).

Universities can strengthen their planning based on their own situation, establish edible landscapes, and utilize campus resources to cultivate the emotional identity of teachers and students. Student participation in planning, planting, cultivation, and harvesting processes, as well as in food production, helps to enhance their sense of happiness, deepen their connection with the university, cultivate practical skills, promote positive emotional influence, and ultimately help the university build a unique brand image.

The third is to strengthen international exchanges and cooperation, draw on the experiences and practices of different regions, and promote the application and promotion of edible landscapes on a global scale.

The edible landscape has established a close connection with the university community, which helps to stimulate and cultivate ecological awareness at the community, national, and global levels. Advocate for an ecological centered worldview and develop sustainable development plans by spreading love for the environment within university campuses. The Edible Landscape Initiative is actively committed to shaping the way students think to drive change in the world, and students will become active agents of change in the world (Coman and Jacob, 2023). Explore how colleges and universities combine the goal of sustainable development with research and outreach projects, especially in response to the COVID-19 and promoting health recovery and sustainable development, while strengthening campus garden committees, professional development and community outreach to promote healthy development within the community. A sustainable university should focus on sustainable campus operations, sustainable research, public outreach, collaboration among institutions, and sustainable courses (Yuan et al., 2013).

Although there have been numerous studies on integrating sustainable development goals into university management and teaching, there is relatively little research on combining

these goals with research and outreach projects. Existing research has identified a range of good practices, including developing guidelines, supporting actions in higher education institutions, and creating tools. The COVID-19 epidemic makes it important to rethink the goal of sustainable development. Higher education institutions need to cooperate with society to promote health recovery and sustainable development. In this process, institutions need to adapt to the challenges of online education to ensure the dissemination of sustainable development goals (Serafini et al., 2022).

Strengthen the Garden Committee, professional development, and community outreach. There is a need for better channels to spread fundraising opportunities within schools and communicate with the wider community. Ultimately, this will strengthen the existing school garden as a carrier to promote food, physical, and social health within the community (Burt et al., 2018).

Research Limitations

The literature review described in this article has some limitations

Firstly, due to the quantity and quality of literature from others, it may not cover all relevant studies, resulting in limitations in conclusions and subjective cognitive influences. Secondly, due to the relatively new application of edible landscapes in universities, related research is still in its early stages, and there are shortcomings in research methods and data collection. Finally, due to the fact that the research described in this article is mainly based on the literature of others and has not been thoroughly conducted through field research and practical verification, there are certain limitations to the reliability and generalization of the conclusions. Testing needs to be conducted in different geographical regions to find specific and reliable answers.

Future research can explore how campus green spaces affect teacher-student relationships, international student perspectives, and their social roles outside of campus. This study calls for a deeper understanding of the interaction between academic and urban environments, balancing the needs of different user groups, and comparing the impact of various global university campus landscape environments on the happiness of campus users. Finally, the study emphasizes the importance of promoting health in the academic environment and advocates for incorporating psychological, social, and symbolic experiences into campus planning. When adjusting and applying edible campus design strategies, full consideration should be given to the impact of cultural preferences in different environments on research results. In addition, future research can increase the sample size, explore the benefits of edible campuses in different geographical and climatic regions, and compare the differences in this area among different universities.

References

- Lin, J., Zhou, M., Luo, H., Zhang, B., Feng, J., & Yi, Q. (2022). Analysis of the Emotional Identification Mechanism of Campus Edible Landscape from the Perspective of Emotional Geography: An Empirical Study of a Chinese University Town. *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health*, 19(18), 11425. <https://doi.org/10.3390/ijerph191811425>
- Jin, Y., Choi, H. S., & Elkin, D. (2022). The value of edible community gardens for the elderly in the specific environment condition, during the epidemic: using a case of Nanjing, in China. *Daniel Elkin*, 7, 113–131. <https://doi.org/10.55412/07.06>
- Xie, Q., Yue, Y., & Hu, D. (2019). Residents' attention and awareness of urban edible landscapes: a case study of Wuhan, China. *Forests*, 10(12), 1142. <https://doi.org/10.3390/f10121142>
- Lee, T., Chou, Y., & Huang, T. (2019). Users' perceptions and attitudes towards edible campus. *International Journal of Design & Nature and Ecodynamics*, 14(1), 30–40. <https://doi.org/10.2495/dne-v14-n1-30-40>
- Solder, A., & Awwaad, R. (2015). Sustainable Urbanism: Towards Edible Campuses in Qatar and the Gulf Region. *Environmental Science, Sociology*. <https://doi.org/10.3390/ifou-a011>
- Sima, R., Micu, I., Maniutiu, D., Sima, N., & Lazar, V. (2010). Edible landscaping - integration of vegetable garden in the landscape of a private property. *Bulletin of University of Agricultural Sciences and Veterinary Medicine*, 67(1), 278–283. <https://doi.org/10.15835/buasvmcn-hort:4974>
- Çelik, F. (2017). The importance of edible landscape in the cities. *Türk Tarım - Gıda Bilim Ve Teknoloji Dergisi*, 5(2), 118. <https://doi.org/10.24925/turjaf.v5i2.118-124.957>
- Foellmer, J., Kistemann, T., & Anthonj, C. (2021). Academic Greenspace and Well-Being — Can Campus Landscape be Therapeutic? Evidence from a German University. *Wellbeing, Space and Society*, 2, 100003. <https://doi.org/10.1016/j.wss.2020.100003>
- Fischer, L. K., Brinkmeyer, D., Karle, S. J., Cremer, K., Huttner, E., Seebauer, M., Nowikow, U., Schütze, B., Voigt, P., Völker, S., & Kowarik, I. (2019). Biodiverse edible schools: Linking healthy food, school gardens and local urban biodiversity. *Urban Forestry & Urban Greening*, 40, 35–43. <https://doi.org/10.1016/j.ufug.2018.02.015>
- Van Den Bogerd, N., Dijkstra, S. C., Seidell, J. C., & Maas, J. (2018b). Greenery in the university environment: Students' preferences and perceived restoration likelihood. *PloS One*, 13(2), e0192429. <https://doi.org/10.1371/journal.pone.0192429>
- Zhou, Y., Wei, C., & Zhou, Y. (2022). How does urban farming benefit participants? Two case studies of the Garden City initiative in Taipei. *Land*, 12(1), 55. <https://doi.org/10.3390/land12010055>
- Yip, C., Zhang, Y., Lu, E., & Dong, Z. Y. (2022). A hybrid assessment framework for human-centred sustainable smart campus: A case study on COVID-19 impact. *IET Smart Cities*, 4(3), 184–196. <https://doi.org/10.1049/smc2.12038>
- Bohn, K., & Chu, D. (2021). Food-productive green infrastructure: Enabling agroecological transitions from an urban design perspective. *Urban Agriculture & Regional Food Systems*, 6(1). <https://doi.org/10.1002/uar2.20017>
- Akoumianaki-Ioannidou, A., Paraskevopoulou, A. T., & Tachou, V. (2016). School grounds as a resource of green space to increase child-plant contact. *Urban Forestry & Urban Greening*, 20, 375–386. <https://doi.org/10.1016/j.ufug.2016.10.009>

- Wang, R., Jiang, W., & Lu, T. (2021). Landscape characteristics of university campus in relation to aesthetic quality and recreational preference. *Urban Forestry & Urban Greening*, 66, 127389. <https://doi.org/10.1016/j.ufug.2021.127389>
- Hajrasouliha, A. (2017). Campus score: Measuring university campus qualities. *Landscape and Urban Planning*, 158, 166–176. <https://doi.org/10.1016/j.landurbplan.2016.10.007>
- Fang, X., Guo, J., & Song, Z. (2019). Research on Satisfaction Evaluation and Optimization Strategy of University Campus Landscape Space. *DEStech Transactions on Social Science, Education and Human Science, ermis*. <https://doi.org/10.12783/dtssehs/ermis2019/29929>
- Yuzhou, Z. (2012). Landscape Analysis of Campus Paddy Field of Shenyang Jianzhu University. *Journal of Shenyang Jianzhu University*. https://en.cnki.com.cn/Article_en/CJFDTOTAL-SJSH201203007.htm
- Jianxi, Y. (2015). Discussion on all- round education effect of university campus landscape:A Case Study of the Botanical Garden for Chinese Plants in Fujian Agriculture and Forestry University. *Fujian Architecture & Construction*. https://en.cnki.com.cn/Article_en/CJFDTOTAL-FJJZ201503033.htm
- Lin, L. (2007). Planning and Designing of University Campus Landscape in China. *Journal of Anhui Agricultural Sciences*. https://en.cnki.com.cn/Article_en/CJFDTOTAL-AHNY200704045.htm
- Yong-Hong, G. (2009). Pondering on campus landscape construction in Zhangzhou normal University. *Journal of Zhangzhou Normal University*. https://en.cnki.com.cn/Article_en/CJFDTOTAL-ZSXZ200902028.htm
- Chang, Y. (2017). Research on Adjacent Neighbourhood Planning of a University Campus---A Case study on South China University of Technology. *Science Discovery*, 5(7), 579. <https://doi.org/10.11648/j.sd.20170507.28>
- Zhao-Xia, Z. (2008). Landscape design in Nanchang Institute of Technology. *Journal of Nanchang Institute of Technology*. https://en.cnki.com.cn/Article_en/CJFDTOTAL-NCSB200805014.htm
- Hongxia, G. (2005). Analysis and Study of Landscape in University “Garden” ——otus pond campus (central campus) in Yangzhou University as an example. *Building Science*. https://en.cnki.com.cn/Article_en/CJFDTOTAL-JZKX200504013.htm
- Yong-Gang, T. (2012). Modern Colleges’ Campus Landscape Design. *Journal of Anhui Agricultural Sciences*. https://en.cnki.com.cn/Article_en/CJFDTOTAL-AHNY201211117.htm
- Khalilnezhad, Amani-Beni, M., & Shen, Z. (2023). Accessibility, visibility and connectivity between urbanites and edible landscape in the Persian gardens. *Acta Horticulturae*, 1374, 109–116. <https://doi.org/10.17660/actahortic.2023.1374.14>
- Li, S. (2014). Study on the Plant Landscape Planning and Design of Henan Agricultural University New Campus. *Northern Horticulture*.
- Cui-hua, M. (2011). Campus landscape design and function: Take Agricultural University of Hebei as an example. *Journal of Agricultural University of Hebei*.
- Sevik, H., Cetin, M., Ozel, H. B., Ozel, S., & Cetin, I. Z. (2020). Changes in heavy metal accumulation in some edible landscape plants depending on traffic density. *Environmental Monitoring and Assessment*, 192(2). <https://doi.org/10.1007/s10661-019-8041-8>

- Tie-mao, S. (2009). Educational Function of Landscape in the Construction of Campus Culture——Take the Campus Landscape Design of Shenyang Jianzhu University as an Example. *Journal of Shenyang Jianzhu University*.
- Zhu, K., & Tang, H. (2013). Ecological Strategies of Landscape Planning and Design in University City. *Applied Mechanics and Materials*, 357–360, 2096–2099.
<https://doi.org/10.4028/www.scientific.net/amm.357-360.2096>