



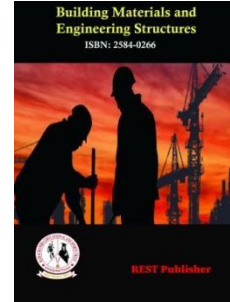
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Evaluation of the Development of Landscape Architecture Using WSM Method

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Abstract: Landscape architecture spans across various dimensions including its objectives, design methodologies, analytical procedures, target clientele, levels of interest, intellectual or knowledge foundations, ethical considerations, connection with the natural environment, and approaches to power dynamics. Within the analytical community, landscape architecture holds a significant role, particularly in landscape ecology, contributing to a comprehensive perspective and wielding influence. The Department of landscape architecture and related fields are spatial Prioritize design to address urban and rural challenges, crafting solutions Parks and garden sand squares etc., considering both environmental and societal needs to foster development and leverage opportunities effectively. This article delves into the practices of regional designers, who configure and organize the design process, while also examining relevant policies. However, regional design principles often exhibit ambiguity, lacking structure and stability, thus presenting challenging scenarios. Moreover, the design process seeks to contribute to broader processes of change, forming an integral aspect of the study. It underscores a dynamic perspective on design, emphasizing communication with stakeholders and the designer's role within the design process, highlighting the need for a renewed cultural outlook. significant portion of the book is that which covers the landscape profession's contribution to the 20th century development to town planning in England and America. Newton discusses the 19th-century English background, including the experimental towns of Saltire, Bourneville, and Port Sunlight and the sociological factors which led to establishing the garden city movement. In Garden Cities of Tomorrow (1902), Ebenezer Howard set out guiding principles which are valid in urban design today: the town and country ideal; limitation in size (32,000 population, 6,000 acres); controlled agricultural buffer zone (greenbelt); development and control by a corporation; planning and density control; separate wards (neighborhoods) developed around the public school; spaciousness for tree-lined streets, public buildings, home sites; ample areas for parks and recreation; provision for industrial employment in municipally or privately owned factories, electrically powered to reduce air pollution; the dispersal of towns separated by controlled agricultural lands; development of intercity transport facilities. The Weighted Sum Method (WSM) is an approach for decision-making and optimization that assesses and contrasts multiple alternatives through a set of criteria. It offers a structured means of amalgamating these criteria, each with its own significance, into a single value. Art in Landscape Architecture, Urban Agriculture and Foodscapes, Therapeutic Landscapes, Socially Engaged Design and Ecological Design. Ecological Impact, Maintenance and Longevity, Community Engagement and Economic Impact. the Ranking of Landscape Architecture. Ecological Design is got the first rank whereas is the Socially Engaged Design is having the Lowest rank.

Keywords: Art in Landscape Architecture, Urban Agriculture and Foodscapes, Therapeutic Landscapes, Socially Engaged Design and Ecological Design.

1. INTRODUCTION

Landscape architecture, particularly, stands out as a prominent subset within the architectural realm, boasting a rich historical background, a vibrant contemporary presence, and promising prospects for the future. The essence of architecture lies in its ability to encompass and harmonize diverse elements, blending human interventions with

natural surroundings to create aesthetically pleasing yet functional spaces. Over the years, experts in this field have offered numerous interpretations and theories, yet the fundamental premise remains rooted in the inherent connection between human beings and their environment, striving to enhance living conditions [1]. Amidst debates, garden design emerges as a central focus for planners, distinguishing between civic and natural elements within landscapes. While gardens have historically been associated with elite societies, serving as symbols of power and status, they also hold aesthetic significance, shaping societal norms and cultural landscapes across various regions. From English to French, Spanish, and Italian gardens, each reflects unique climatic, topographical, and historical influences, showcasing the interplay between culture and environment [2]. The Department of landscape architecture and related fields are spatial Prioritize design to address urban and rural challenges, crafting solutions Parks and garden sand squares etc., considering both environmental and societal needs to foster development and leverage opportunities effectively. This categorization, as outlined by scholars, sheds light on the landscape architecture design process and its interactions, offering valuable insights into educational approaches. Regional design, grounded in natural structures, adopts a strategic approach within spatial contexts, prioritizing future-oriented scenarios for various regions [3]. This article delves into the practices of regional designers, who configure and organize the design process, while also examining relevant policies. However, regional design principles often exhibit ambiguity, lacking structure and stability, thus presenting challenging scenarios. Moreover, the design process seeks to contribute to broader processes of change, forming an integral aspect of the study. It underscores a dynamic perspective on design, emphasizing communication with stakeholders and the designer's role within the design process, highlighting the need for a renewed cultural outlook [4]. Two prevalent and, in my opinion, flawed theories have recently gained prominence, challenging the perception of landscape architecture as an art form and its social utility despite its evident significance. The first theory focuses on human landscapes versus natural landscapes and their respective processes, often leading to confusion regarding needs and accomplishments. The second theory regards landscape architecture as a subset of art, emphasizing known forms and their application, alongside the manipulation of ideas. Similar to other disciplines, landscape architecture operates within a defined framework, utilizing various techniques such as manipulation, reuse, combination, decomposition, extraction, conversion, and reintroduction of existing patterns. While the scope for innovation within this framework may seem limited, it continuously generates novel interpretations and creations, imbuing familiar elements with fresh meanings [5]. The execution of landscape architecture varies significantly based on styles, project types, and even among professionals within the field. Are there additional noteworthy disparities in approach? This paper delineates six distinct approaches or principles of practice in landscape architecture, outlining the typology and underlying values associated with each, as detailed in These approaches, observed across different specializations within in the United States landscape architecture, shed light on a broad spectrum architectural practice [6]. Landscape architects, both in their professional practice and educational pursuits, continually find value in both basic and applied research. Recent studies among academics have highlighted the symbiotic relationship Landscape Architecture Research in the field and Between teaching, emphasizing the importance of establishing connections for effective training. However, discussions surrounding these connections often reveal a perceived weakness in the existing links [7]. John Dixon Hunt, an esteemed scholar renowned for his expertise in Gardens and the Picturesque, has returned to writing extensively on this subject matter. His latest work delves into the intricate connections between gardens and intellectual, social, economic, and political realms, as well as their relationship to artistic forces. This new volume, covering the period between 1971 and 1990, offers valuable insights into landscape architecture, particularly for American students who may not be familiar with the sources he draws upon. It comprises seven published articles, four of which have been compiled but not yet published, along with a collection of lectures [8]. The need for research to guide design decisions in landscape architecture is steadily growing. Within the landscape architecture domain, educators play a pivotal role, serving as both practitioners and scholars, contributing to the field's advancement through research endeavors. This article is in landscape architecture Contributions of academics aims to establish a framework for evaluating their impact [9]. Richard Chenoweth, a professor at the University of Wisconsin at Madison, Urban and Specializing in regional planning. He has a B.S. at the University of Iowa degree in psychology, as well MA and Ph.D. degrees in social psychology from the University of Illinois at Urbana. His research interests are: lie in applying scientific methods to address issues related to public policy in landscape architecture and aesthetic evaluation. [10]. Steffen Jinhua's, an assistant professor at Delft University of Technology, focuses his work primarily on urbanism and landscape architecture. His research centers around theories within urban design, with a particular emphasis on methods and techniques such as Design Research, Research-Design, Visual natural assessment and representation. He 'Architecture and Landscape' He is leading the research project. and serves as the series editor of Reuses. Additionally, he acts as an advisor to regional authorities and is actively involved in post-MSc programs, leading design studios [11]. The Layer-cake model, originating in the 1970s and prevalent in the Netherlands during the 1980s, particularly within at Wageningen University

Landscape Architecture Sphere, Designed by the architecture team (Dochart, 2007). This model, heavily influenced by Ian Choke's seminal work "Design with Nature," as outlined in "Design with Nature," delineates three interconnected layers within landscapes: abiotic, biological, and anthropological [12]. Addressing the impacts of climate change poses significant challenges for landscape architecture, particularly in urban and natural settings. These challenges necessitate meticulous attention to deliberate design, rooted in well-founded arguments and research-based approaches. Throughout the design process, careful consideration of climatic effects is essential, often requiring iterative testing and refinement of designs to ensure resilience and effectiveness [13]. Landscape architecture, as a discipline, has undergone significant evolution and development over time, reflecting shifts in societal values, environmental awareness, and technological advancements. Initially rooted in garden design and the embellishment of outdoor spaces, landscape architecture has expanded its scope to encompass broader concerns such as ecological sustainability, urban planning, and social equity. This evolution has been driven by a growing recognition of the critical role landscapes play in mitigating environmental degradation, fostering human well-being, and creating resilient communities [14]. Today, landscape architects are involved in a diverse range of projects, from designing public parks and recreational areas to revitalizing urban landscapes and restoring degraded ecosystems. They employ a multidisciplinary approach, integrating elements of ecology, sociology, engineering, and design to address complex challenges facing contemporary societies. Moreover, with the advent of digital tools and technologies, landscape architects have access to innovative methods for visualizing, analyzing, and communicating their ideas, enabling them to create more dynamic and responsive designs [15].

2. MATERIALS AND METHOD

Art in Landscape Architecture: Landscape design involving trees, shrubs, and other plant life transcends mere property investment. It is an art form that focuses on enhancing human satisfaction and providing outdoor spaces for pleasure. Through conscious arrangement and thoughtful management, it orchestrates the harmonious interaction of elements within the system.

Urban Agriculture and Foodscapes: Urban Agriculture (UA) encompasses diverse livelihood systems and represents a dynamic concept that spans various activities. It encompasses subsistence production and processing at the household level, extending to commercialized agricultural practices. UA manifests in different locations and operates within a range of socioeconomic conditions, adapting to the prevailing political regimes.

Therapeutic Landscapes: When human emotions are intertwined with physical and built environments, and social conditions, the resulting scenery can have therapeutic effects. Therapeutic landscapes, as defined, are spaces that contribute to treatment or healing, aligning with both the physical and psychological needs of individuals. These places encompass natural environments that play a crucial role in alleviating diseases and promoting well-being.

Socially Engaged Design: In the socially engaged design model, the process is structured into five sequential levels: Research, Define, Ideate, Develop, and Realize. Progressing from left to right through these levels, a systematic organization of the design process is observed.

Ecological Design: Ecological design, also known as environmental design, is an approach focused on designing products and services with careful consideration of their environmental implications throughout their entire life cycle. This approach pays particular attention to the environmental impacts of objects and services.

Ecological Impact: The environmental impact results from the actions of both humans and natural phenomena, affecting the ecosystem in various ways. These impacts can be either beneficial or adverse, altering the environment accordingly.

Maintenance and Longevity: Longevity encompasses both the length of one's life and the quality of their later years, emphasizing living a long and healthy life. It not only refers to the duration a person is expected to live but also signifies their overall health and well-being during their later stages of life. While average life expectancy indicates the typical lifespan, longevity also serves as a descriptor of one's health and vitality throughout their extended years.

Community Engagement: Social engagement encompasses a wide array of activities, including volunteer work, community gardening, educational training, blood donation, environmental initiatives, and more. It embraces agility and a variety of forms, offering limitless opportunities for individuals to participate and contribute to their communities.

Economic Impact: Community involvement spans a broad spectrum of activities, from voluntary work and community gardening to educational training, blood donation, environmental initiatives, and beyond. This agile and adaptable concept takes on various forms, providing individuals with countless opportunities to participate in and contribute to their communities.

WSM Method: The Weighted Sum Method (WSM) is an approach for decision-making and optimization that assesses and contrasts multiple alternatives through a set of criteria. It offers a structured means of amalgamating these criteria, each with its own significance, into a single value. This facilitates informed decision-making by quantitatively evaluating the alternatives. As far as we know, current solutions for dealing with continuous multi-objective optimization problems predominantly hinge on precedence relations. In a traditional weighted sum model, unstrained solutions are eliminated through an optional link, as referenced [16]. A method for ranking cameras It is suggested to use the Weighted Sum Method (WSM) when making decisions based on multiple factors. This system employs WSM to compute preference scores for different camera options. In the WSM framework, weights are assigned to team scores and features. Customer reviews serve as scores, while the weight concept is defined as the average number of customers served, as explained in the document [17]. The discussion covers both the Weighted Sum and the power source Weighted Product methods are utilized. The Weighted Sum technique assigns major weights to each attribute; the total of an option's assessments determines its score. In contrast, performance scores—rather than efficiency scores are determined when using the Weighted Product approach. Changing the number of times has an effect on the score's significance, with the power being raised to enhance its importance, as detailed in the text [18]. The Weighted Sum Method involves a blend of multiplication and subtraction and is applied to add and organize candidate keywords. We've previously covered the generation and depiction of these keywords. It employs a weighted sum of a four-dimensional feature vector, though this weighted sum undergoes changes during the process. The four features have unique parsing capabilities due to the weight requirements. This keyword attribute enhances discrimination, resulting in more effective manual detection. However, manually determining the weight vector for the domain is excessively time-consuming, as indicated in the text [19]. The suggested adaptive weighted sum system prioritizes predetermined weight choices instead of altering weights. It introduces extra inequalities and specific restrictions to tackle uncharted territories, particularly in non-convex regions. This adaptive approach generates solutions that are both non-Pareto and distributed, in contrast to top-ranked solutions that frequently miss more advantageous alternatives. The potential downside of crossing normal boundaries is underscored, with a focus on the reliance on equality constraints as a significant concern in this effective versatile method, as mentioned in the text [20]. Regarding weighted sum multi-objective optimization (MOO), the method, although reliable, is not the most efficient for producing multiple solution points by varying weights. Nevertheless, it incorporates a single-answer set selection that showcases alternatives and consistently offers that point. The approach exposes options to varying weights and is versatile when applied to different methods [21]. This paper presents a weighted sum technique for a clinical computer-assisted algorithm used in trauma diagnosis. Trauma is a highly significant medical issue with immediate physiological consequences. The method utilizes probability weights established by medical experts in a knowledge base, which includes comprehensive information on different types of shock. The findings, derived from the analysis of data from nine patients, offer a cumulative ranking of shock types based on a combination of two-level weights [22]. The Weighted Sum Method is a common feature in evolutionary multi-objective algorithms like the mean/d-lows algorithm, as suggested in. This research aims to harness the benefits of the Weighted Sum Method, applying it to non-convex problems to tackle challenges frequently encountered by other techniques. In the field of multi-objective optimization, the Weighted Sum Method enjoys broad utilization because of its systematic approach to weight adaptation [23] This approach systematically adjusts weights, leading to distinct optimal solutions for each individual objective optimization. These solutions are then compared with front approximations, where unspecified anchor points are assigned values of 0. Importantly, the weighted sum method has been a fixture in optimization settings since its inception [24]. Among various options, the weighted sum approach is widely acknowledged and commonly used. The suggested algorithm employs three objective functions – base pair score, entropy, and weight fully matched column (WFMC) – during the selection process, which are combined using a weighted sum technique to create a comprehensive similarity measure. The proposed Gray-Weighted Sum Model (GWSM) takes into consideration factors such as data ranges, usage, and alternatives, influencing the results and accounting for uncertainties. Gambia, situated in West Africa, is identified as the top-ranked country. However, considering environmental uncertainty over an extended period, GWSM's long-term suitability for investors is considered relatively high [25].

3. RESULTS AND DISCUSSION

Table 1 Shows the Landscape Architecture for Analysis using the WSM Method. Ecological Impact, Maintenance and Longevity, Community Engagement and Economic Impact. Art in Landscape Architecture, Urban Agriculture and Foodscapes, Therapeutic Landscapes, Socially Engaged Design and Ecological Design it also the data set value.

TABLE 1. Landscape Architecture

	Ecological Impact	Maintenance and Longevity	Community Engagement	Economic Impact
Art in Landscape Architecture	43.160	140.356	30.160	37.856
Urban Agriculture and Foodscapes	53.060	158.471	43.153	30.050
Therapeutic Landscapes	40.350	125.635	30.140	45.485
Socially Engaged Design	44.360	128.280	55.465	42.652
Ecological Design	64.650	159.285	30.458	35.235

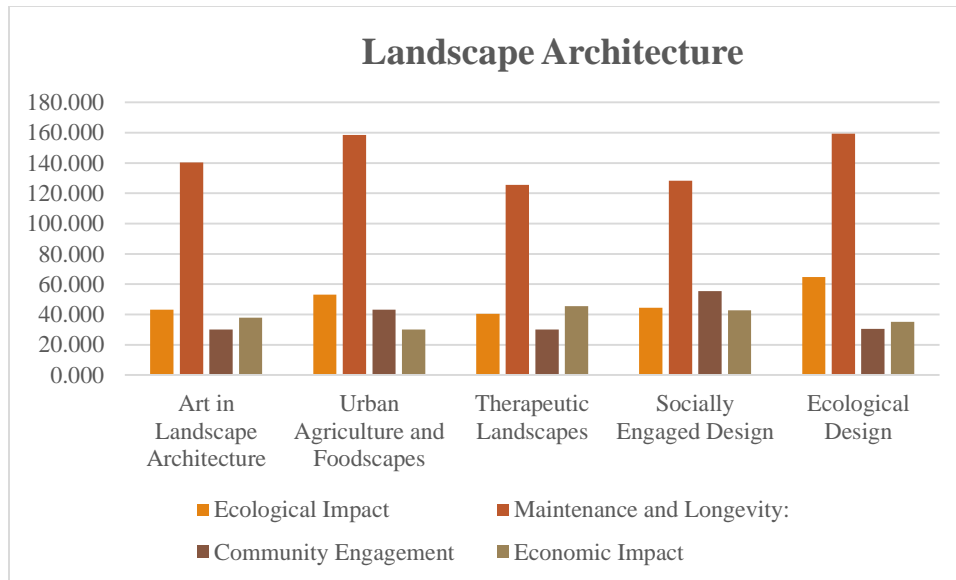


FIGURE 1. Landscape Architecture

Figure 1 Shows the Landscape Architecture for Analysis using the WSM Method. Ecological Impact, Maintenance and Longevity, Community Engagement and Economic Impact. Art in Landscape Architecture, Urban Agriculture and Foodscapes, Therapeutic Landscapes, Socially Engaged Design and Ecological Design it is seen that Ecological Design is showing the Highest Value for Ecological Impact and Therapeutic Landscapes is showing the lowest value. Ecological Design is showing the Highest Value for Maintenance and Longevity and Therapeutic Landscapes is showing the lowest value. Socially Engaged Design is showing the Highest Value for Community Engagement Therapeutic Landscapes is showing the lowest value. Therapeutic Landscapes is showing the Highest Value for Economic Impact Urban Agriculture and Foodscapes is showing the lowest value.

TABLE 2. Normalized Data

Art in Landscape Architecture	0.66759	0.88116	0.99934	0.79380
Urban Agriculture and Foodscapes	0.82073	0.99489	0.69845	1.00000
Therapeutic Landscapes	0.62413	0.78874	1.00000	0.66066
Socially Engaged Design	0.68616	0.80535	0.54341	0.70454
Ecological Design	1.00000	1.00000	0.98956	0.85285

shows the Table 2 Normalized data for Landscape Architecture. Ecological Impact, Maintenance and Longevity, Community Engagement and Economic Impact. Art in Landscape Architecture, Urban Agriculture and Foodscapes, Therapeutic Landscapes, Socially Engaged Design and Ecological Design it is the also normalized data value.

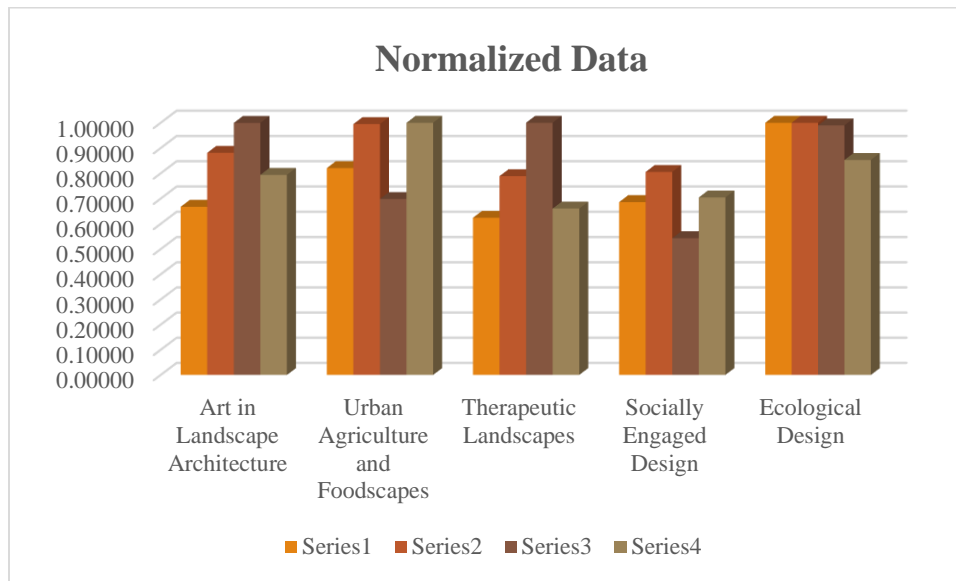


FIGURE 2. Normalized Data

shows the Figure 2 Normalized data for Landscape Architecture. Ecological Impact, Maintenance and Longevity, Community Engagement and Economic Impact. Art in Landscape Architecture, Urban Agriculture and Foodscapes, Therapeutic Landscapes, Socially Engaged Design and Ecological Design it is the also normalized data value.

TABLE 3. Weightages

0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25

Table 3 shows Weightages used for the analysis. We take same weights for all the parameters for the analysis

TABLE 4. Weighted Normalized Decision Matrix

Art in Landscape Architecture	0.16690	0.22029	0.24983	0.19845
Urban Agriculture and Foodscapes	0.20518	0.24872	0.17461	0.25000
Therapeutic Landscapes	0.15603	0.19719	0.25000	0.16516
Socially Engaged Design	0.17154	0.20134	0.13585	0.17613
Ecological Design	0.25000	0.25000	0.24739	0.21321

Table 4 shows the weighted normalized decision matrix for Ecological Impact, Maintenance and Longevity, Community Engagement and Economic Impact. Art in Landscape Architecture, Urban Agriculture and Foodscapes, Therapeutic Landscapes, Socially Engaged Design and Ecological Design it is the also multiple value.

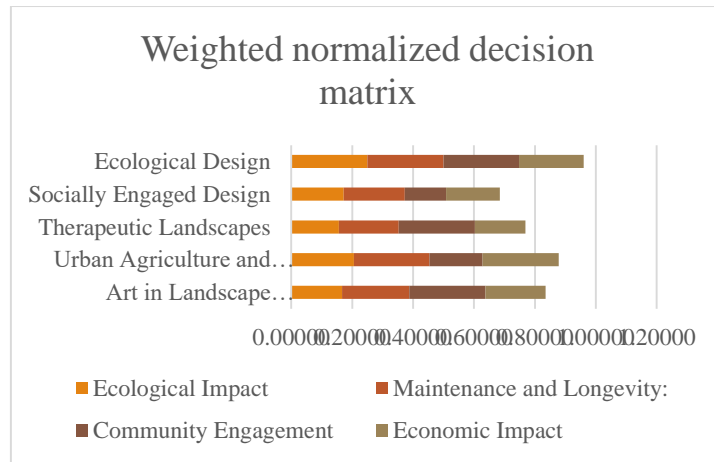


FIGURE 3. Weighted Normalized Decision Matrix

Figure 3 shows the weighted normalized decision matrix for Ecological Impact, Maintenance and Longevity, Community Engagement and Economic Impact. Art in Landscape Architecture, Urban Agriculture and Foodscapes, Therapeutic Landscapes, Socially Engaged Design and Ecological Design it is the also multiple value.

TABLE 5. Preference Score & Rank

	Preference Score	Rank
Art in Landscape Architecture	0.83547	3
Urban Agriculture and Foodscapes	0.87852	2
Therapeutic Landscapes	0.76838	4
Socially Engaged Design	0.68486	5
Ecological Design	0.96060	1

Table 5 shows the final result of WSM for Landscape Architecture. Preference Score is calculated using the Ecological Design is having is Higher Value and Socially Engaged Design is having Lower value.

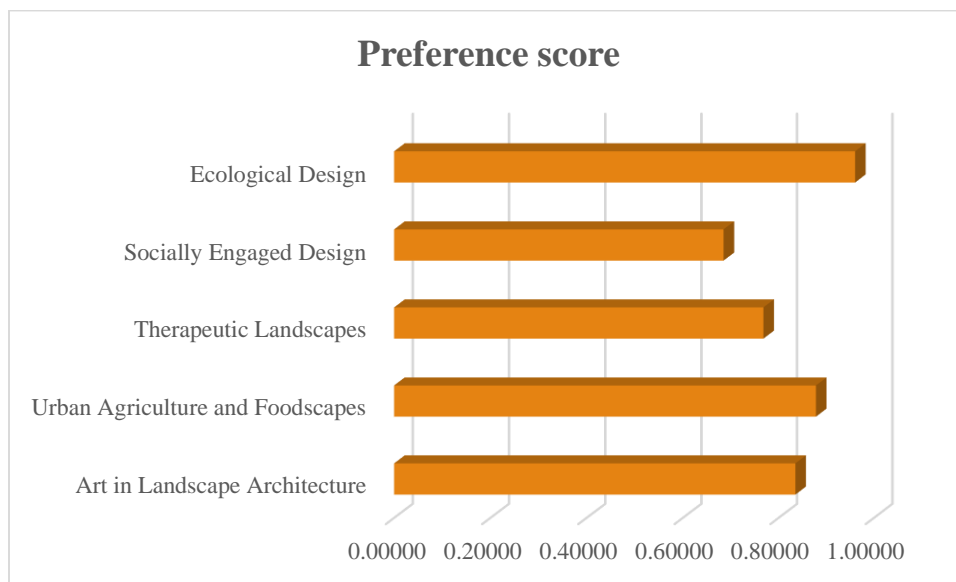


FIGURE 4. Preference score

Figure 4 shows the final result of WSM for Landscape Architecture. Preference Score is calculated using the Ecological Design is having is Higher Value and Socially Engaged Design is having Lower value.

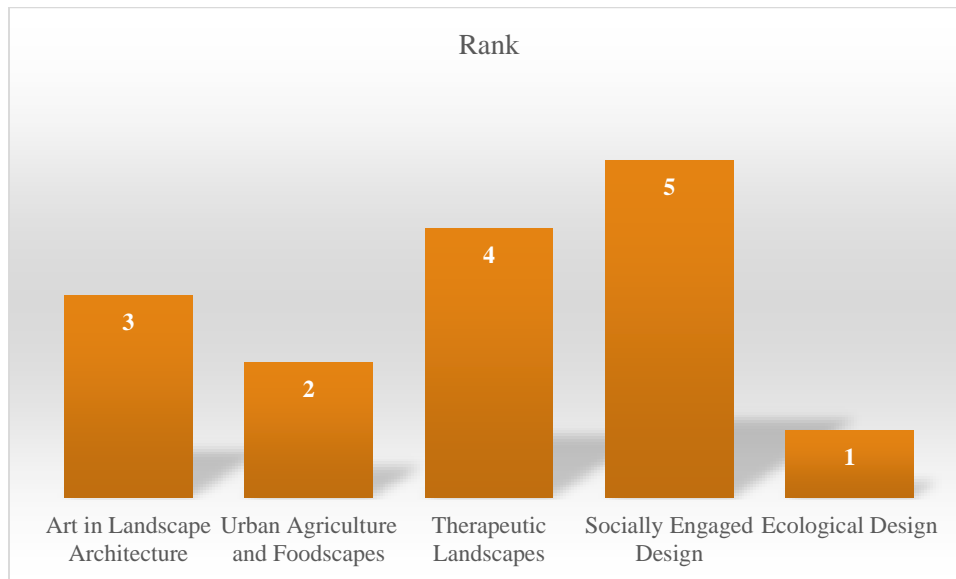


FIGURE 5. Rank

Figure 5 Shows the Ranking of Landscape Architecture. Ecological Design is got the first rank whereas is the Socially Engaged Design is having the Lowest rank.

4. CONCLUSION

Landscape architecture spans across various dimensions including its objectives, design methodologies, analytical procedures, target clientele, levels of interest, intellectual or knowledge foundations, ethical considerations, connection with the natural environment, and approaches to power dynamics. Within the analytical community, landscape architecture holds a significant role, particularly in landscape ecology, contributing to a comprehensive perspective and wielding influence. The Department of landscape architecture and related fields are spatial Prioritize design to address urban and rural challenges, crafting solutions Parks and garden sand squares etc., considering both environmental and societal needs to foster development and leverage opportunities effectively. Landscape architecture, particularly, stands out as a prominent subset within the architectural realm, boasting a rich historical background, a vibrant contemporary presence, and promising prospects for the future. The essence of architecture lies in its ability to encompass and harmonize diverse elements, blending human interventions with natural surroundings to create aesthetically pleasing yet functional spaces. Over the years, experts in this field have offered numerous interpretations and theories, yet the fundamental premise remains rooted in the inherent connection between human beings and their environment, striving to enhance living conditions. Landscape design involving trees, shrubs, and other plant life transcends mere property investment. It is an art form that focuses on enhancing human satisfaction and providing outdoor spaces for pleasure. Through conscious arrangement and thoughtful management, it orchestrates the harmonious interaction of elements within the system. Urban Agriculture (UA) encompasses diverse livelihood systems and represents a dynamic concept that spans various activities. It encompasses subsistence production and processing at the household level, extending to commercialized agricultural practices. UA manifests in different locations and operates within a range of socioeconomic conditions, adapting to the prevailing political regimes. When human emotions are intertwined with physical and built environments, and social conditions, the resulting scenery can have therapeutic effects. Therapeutic landscapes, as defined, are spaces that contribute to treatment or healing, aligning with both the physical and psychological needs of individuals. These places encompass natural environments that play a crucial role in alleviating diseases and promoting well-being. The Weighted Sum Method (WSM) is an approach for decision-making and optimization that assesses and contrasts multiple alternatives through a set of criteria. It offers a structured means of amalgamating these criteria, each with

its own significance, into a single value. Art in Landscape Architecture, Urban Agriculture and Foodscapes, Therapeutic Landscapes, Socially Engaged Design and Ecological Design. Ecological Impact, Maintenance and Longevity, Community Engagement and Economic Impact. the Ranking of Landscape Architecture. Ecological Design is got the first rank whereas is the Socially Engaged Design is having the Lowest rank.

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