

THE ROLE OF A LANDSCAPE REHABILITATION STUDENT PROJECT IN CURRENT LANDSCAPE EDUCATION - HEALING URBANIZATION'S FOOTPRINT

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Abstract: The Giurgeului Depression has been significantly impacted by human intervention, resulting in numerous scars on the landscape. A comprehensive rehabilitation plan is imperative for the Suseni quarry area to restore its natural features. This initiative, spearheaded by the local council and municipality, collaborates with the Sapientia Hungarian University of Transylvania's Department of Horticulture and the Babeş-Bolyai University's Faculty of Biology and Geology. They've launched a research scholarship program for students focused on a research and landscape rehabilitation plan tender within Suseni's administrative region. Large scars created by human activities, adjacent to a valuable natural environment, significantly alter the natural landscape features and are detrimental to the visual and ecological relationship systems. Those need urgent rehabilitation. Student projects serves as a potential model for transforming natural landscapes affected by human actions. It aims to teach landscape design through experimental approaches, aligning with modern research-driven design methods for strategic planning. Moreover, it seeks to enhance student projects for practical implementation by local authorities, contributing positively to the area's ecosystem and landscape. Much has already been taken from this landscape, and it is now time to give something back to the area, the local ecosystem, and the landscape.

Keywords: students project, quarry, reclamation, rehabilitation concept, footprints, renaturalization

Introduction

This paper explores the process of translating landscape design by using the example of student work for an originally natural landscape marked by human interventions. It aims to address the question of

how students can be taught by an experimental approach to landscape design, particularly in light of new strategic planning tasks that demand research-oriented design methods and

how can a student project be enhanced and used by local authorities.

According to Scully and Kerr (2014), the concept of student workload holds significant importance and complexity. In these students work publication, we present a collection of inspired designs, innovative concepts, and visionary projects crafted by the next generation of landscape architects. Each project showcases the dedication and passion of these talented students as they push the boundaries of design, seeking to create harmonious relationships between people and their surroundings.

The recognition of creative landscape analysis as an experimental process of translation yields numerous productive implications for teaching landscape design, particularly in relation to formulating a design problem (Tietjen, 2013). This publication not only celebrates the artistic prowess of these students but also highlights their deep understanding of ecological systems, cultural contexts, and the social impact of their designs. Their projects aim to foster connections, promote well-being, and inspire a sense of wonder in the natural world.

The Landscape Planning module at the Technological and Higher Education Institute of Sapientia is offered during the third year of their four-year Bachelor's program in Landscape Architecture. This 14-week module primarily focuses on introducing research concepts and methods that are relevant to landscape architectural inquiries, with a specific emphasis on their potential application in landscape planning and design.

Project-Based Learning (PBL) has been fully integrated. PBL entails the use of authentic problems that are closely aligned with real-world situations (Al-Balushi and Al-Aamri, 2014) and empowers students to conduct investigations at their own pace and in their own unique ways, resulting in a highly

effective approach for enhancing student engagement and fostering critical thinking skills (Wurdinger et al., 2007).

In addition, the incorporation of group work in this module promotes collaborative learning, which has been found to be more effective and leads to improved critical thinking performance and deeper learning. This emphasis on collaborative learning is essential to the overall goals of the module (Gokhale, 1995; Newman, et al., 1995).

1. Call for tenders, terms and conditions

Regarding the rehabilitation concept plan of the Suseni quarry (**Fig. 1.**), the initiative was instigated by the local council and municipality. The university's lecturers and students received their cordial support during the preparation of the proposal. The Harghita County Association and the Harghita County Council, in collaboration with the Suseni Mayor's Office, the Sapientia Hungarian University of Transylvania, Department of Horticulture, and the Faculty of Biology and Geology of the Babeş-Bolyai University, launched a research scholarship program for students pursuing their bachelor's, master's, and doctoral degrees, specialized in this field.

The tender process consisted of two stages. The first stage was an open design competition, and the winning design would be further developed in the second stage with the involvement of associated higher education institutions.

I. In the first stage, a research plan was formulated and a recycling proposal was visualized. This phase included important studies related to landscape rehabilitation, relevant conclusions, and proposals presented in written and drawing formats.



Fig. 1. Upper view of Suseni quarry (from the tender)

II. In the second stage, the winning research plan and recycling proposal were further developed in detail so that the commissioning institution could utilize it effectively in the subsequent planning process.

The tender call emphasized the importance of multidisciplinary thinking, specifically the interdisciplinary approach in landscape planning, which is necessary for a task of this magnitude. It requires the collaboration of various disciplines, and therefore the professional diversity of the teams was a fundamental requirement for the application process and for achieving a high-quality outcome.

2. Methodology

The research methods employed in this context are diverse and vary based on the specific goals of inquiry. These methods encompass various approaches, ranging from the accumulation of existing design knowledge through logical argumentation to case study

research methods. Comparative analysis based on levels of intervention and design means is utilized to facilitate this type of research.

Given that the majority of the students share a similar educational background with limited or no prior experience in rigorous research, their baseline cognition level in research is generally low. To address this, action research has been undertaken during module deliveries to evaluate the effectiveness of Project-Based Learning (PBL) approaches in fostering research-oriented learning among our undergraduate landscape students.

3. Location

Human intervention has notably affected the Giurgeului Depression, leaving multiple scars on its landscape. The Suseni quarry area necessitates a comprehensive concept plan for rehabilitation to reinstate its natural landscape features. The creation of such a plan marks the first crucial stage in the successful healing of the landscape, a pivotal factor for attaining positive results.

The large scars created as a result of human activities significantly alter the natural landscape features. These wounds, including mine areas, are detrimental to the visual and ecological relationship systems. They represent a significant change in the ecological, growing area and landscape features, referred to as "errors in the landscape." Landscape planning tools can aid in correcting these errors through the process of landscape rehabilitation, which can accelerate the healing of landscape wounds and injuries.

The research and landscape rehabilitation plan tender is situated within Suseni's administrative region (**Fig. 2.**), specifically along county road number 138, positioned between the settlements of Liban and the settlement center, bordering a significant natural environment. The quarry predominantly consists of andesite, a resilient dark gray volcanic rock well-suited for road construction and paving purposes. Andesite mining started in the late 1930s and is still ongoing in the Suseni mine, owned by the Lafarge mining company with French capital. It is one of the largest and most modern quarries in Romania, with six extraction levels covering an area of

almost 100 ha, and an annual extraction volume of approximately 1 million tons of stone. The extracted stone, totaling over one hundred million tons, was utilized in the construction of railway networks and airports throughout Romania. The mining period in the mine lasts for approximately two to three years, after which it may be closed.

The quarry's location is highly advantageous, given its spectacular setting and accessibility by railway from the direction of Voşlobeni. Moreover, the county road passes over the mine, which makes it a suitable tourist destination after its closure. Giurgeului Depression tourism represents almost a quarter of the county's tourism. The quarry currently represents a landscape wound that requires healing and utilization of its touristic potential to host cultural-community events, festivals, landscape awareness and nature conservation programs, and educational trails. Recently, in cooperation with World Wildlife Fund (WWF) Romania and the Natura 2000 authority, a preliminary mine rehabilitation schedule was prepared, which included building a lookout and strengthening the copper interfaces.

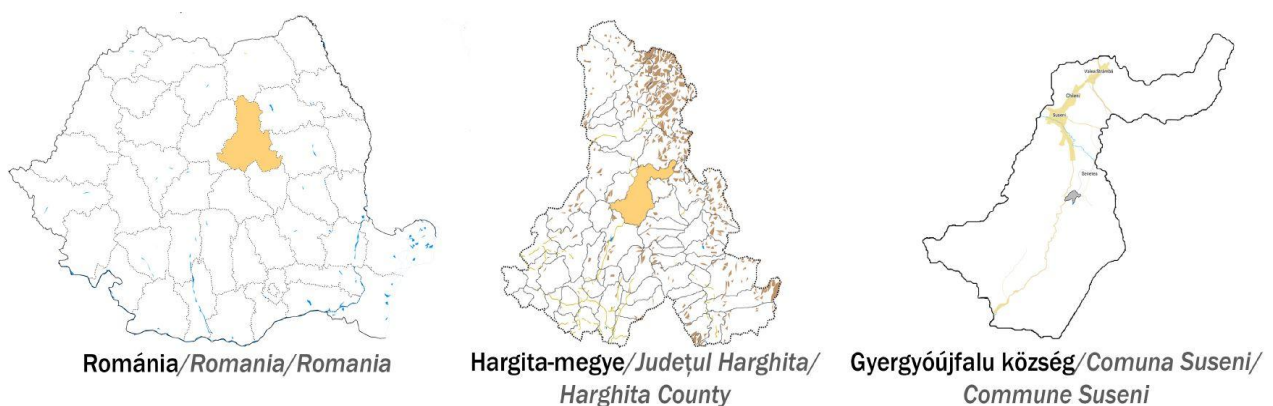


Fig. 2. Location (from students' work, Team 4)

4. Work process

4.1. Tune in

At the onset of the work process, a number of preliminary studies were conducted in collaboration with students, including pre-documentation works, landscape philosophy, historical land use studies, and the process of development and transformation of the various landscape elements. A broader examination revealed that the Suseni quarry is not a unique mining site within the Giurgeului Depression, but rather a landscape wound. This was further evidenced by the proximity of the Voşlobeni quarry.

4.2. Site visit or fieldwork

At the heart of fieldwork lies the essence of learning in real time and real places, with the outdoors serving as the primary laboratory for landscape architecture education. Developing the ability to perceive and comprehend the landscape is considered the initial step in cultivating a keen visual sense. This process involves observing the forms and functions of the landscape, which cannot be accomplished at a professional level without engaging in activities such as drawing, sketching, measuring, and creating cross-sections. By physically experiencing the landscape, designers gain a deeper understanding of its form, emphasizing the significance of bodily engagement in comprehending and manipulating the landscape as a designer. (Fekete and Toorn, 2021).

During the site inspection, the area was evaluated for its characteristics, including its accessibility, walkability possibilities, and visual connections. From the lookout point along County Road No. 138, the extensive size of the mine area and the resulting landscape

wound were evident. The impact of the quarry could be felt not only at the settlement level but also at the landscape scale level, making it a defining visual element. The Voşlobeni quarry, located on the opposite hillside, was also visible from the lookout point. Thus, the presence of quarries in the Giurgeului Depression can be considered a characteristic landscape feature. Observing the huge soil profiles, layers, stratifications, level differences, and the perception of the "lunar landscape" and destruction amidst nature near the mine are all defining experiences (**Fig. 3.**).

Mining activities are still being carried out in the area, and their negative impacts such as noise and dust can be felt in the surrounding environment. As landscape and garden architect Attila Csemez points out, "something must be sacrificed for something". While mining operations are still ongoing and expected to continue for a few more years, it is important to plan for the eventual return of the area to nature and human use, especially considering the high-quality raw materials that were extracted from this quarry and used for urban development over the years.

In certain locations, signs of nature reclaiming the area are visible as pioneer vegetation emerges in small patches. However, to accelerate this process, human intervention is required. This can be achieved through the implementation of engineering and biological methods, as well as landscape planning interventions that promote nature-based solutions in harmony with the ecosystem. By strengthening the natural connection systems and supporting local ecosystem systems, the area can be reintroduced into the cycle of use.



Fig. 3. View above the mine in the direction of Voşlobeni (personal photo)



Fig. 4. Site survey (personal photos)

4.3. Analyzes

The analyses encompass a broad spectrum of scales, ranging from landscape-level analyses, such as topographical and hydrographic conditions, as well as ecosystem networks, to area studies and on-site analyses (**Fig. 4.**) that delve into more specific aspects, such as accessibility, terrain dynamics, visual relationships, (**Fig. 5.**) surrounding plant associations (**Fig. 6.**), and geological conditions (**Fig. 7.**).

4.4. Concepts and post-utilization suggestions

The post-utilization of mining areas requires careful consideration and planning. The concepts (**Fig. 8.**, **Fig. 9.**, **Fig. 10.**) and after-use suggestions should take into account the extent and location of the mining areas, as well as the economic purpose and extraction technology used.

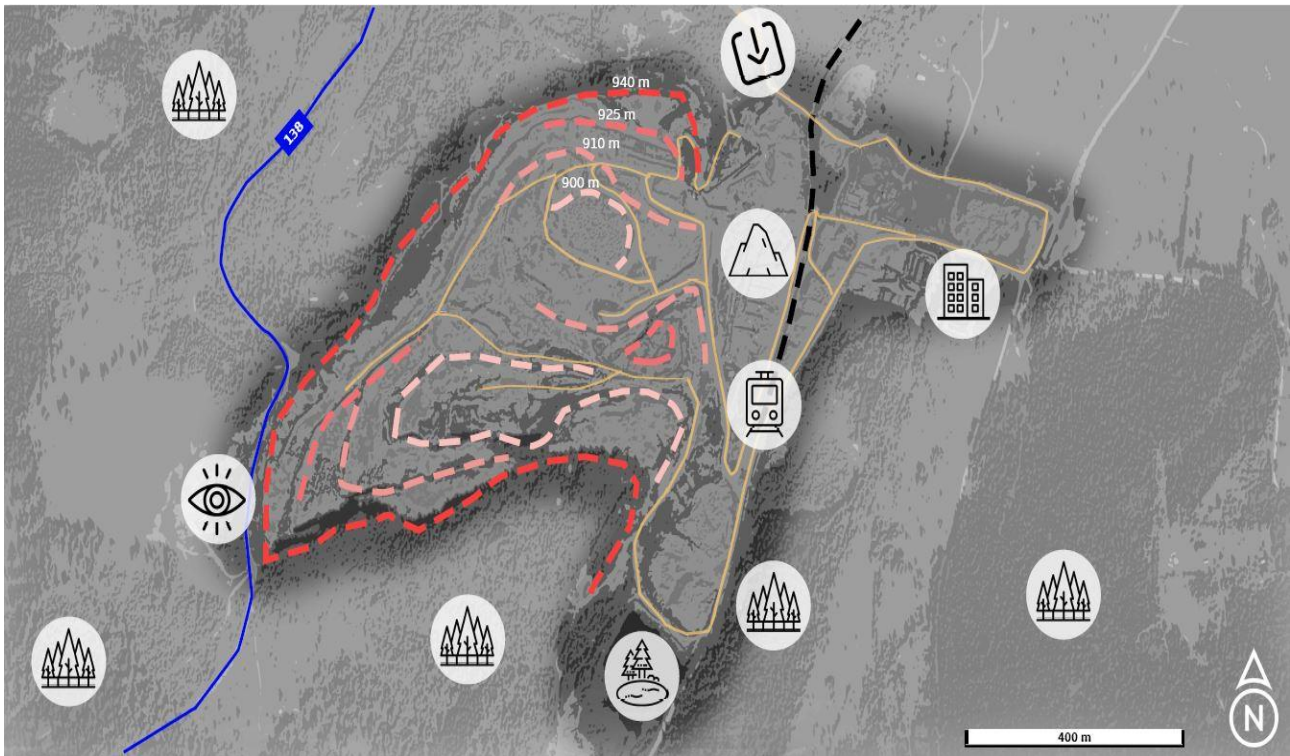


Fig. 5. Examination of the design area (from students' work, Team 2)

The proposed plans should be in harmony with nature and aim to manage the area in cooperation with it, serving both human and natural needs, including the protection of natural values and passing them on to future generations. The plans should include sustainable solutions that preserve and enhance the surrounding flora and fauna, and ensure a balanced and resilient ecosystem.

The function scheme (**Fig. 11.**) is a visual representation that illustrates the relationships and interdependencies between the independent spatial units within a given external space and landscape. It provides a framework for the activities carried out within these spatial units, defining their respective functions. Through the function scheme, it is possible to strategically optimize the placement of existing and

proposed functions within the area. This enables efficient utilization of the available resources, while ensuring that the functions are in line with the goals of the landscape plan.

When devising post-use proposals, it was crucial to manage the area comprehensively, considering its functions to ensure optimal utilization and prolong the area's lifespan. After consulting with the municipality and assessing the local characteristics, it was deemed appropriate to incorporate some form of tourism. Accordingly, post-use proposals (**Fig. 13.**) were formulated, including a tent camp serving as a stopover on a hiking route, a nature trail, a sculpture park, a cultural center, a community space, an adventure park, LandArt installations (**Fig. 12.**), and more.

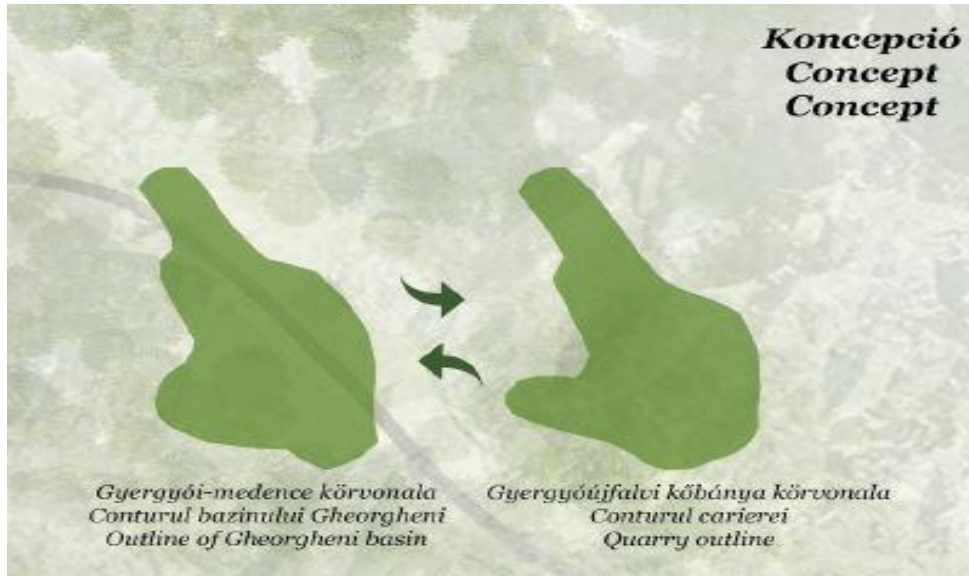


Fig. 8. Concept diagram based on analogy (from students' work, Team 5)



Fig. 9. Concept diagram, renaturalization and multi-use model (from student's work, Team 2)



Fig. 10. Concept figure, renaturalization process in several steps (from student work, Team 1)

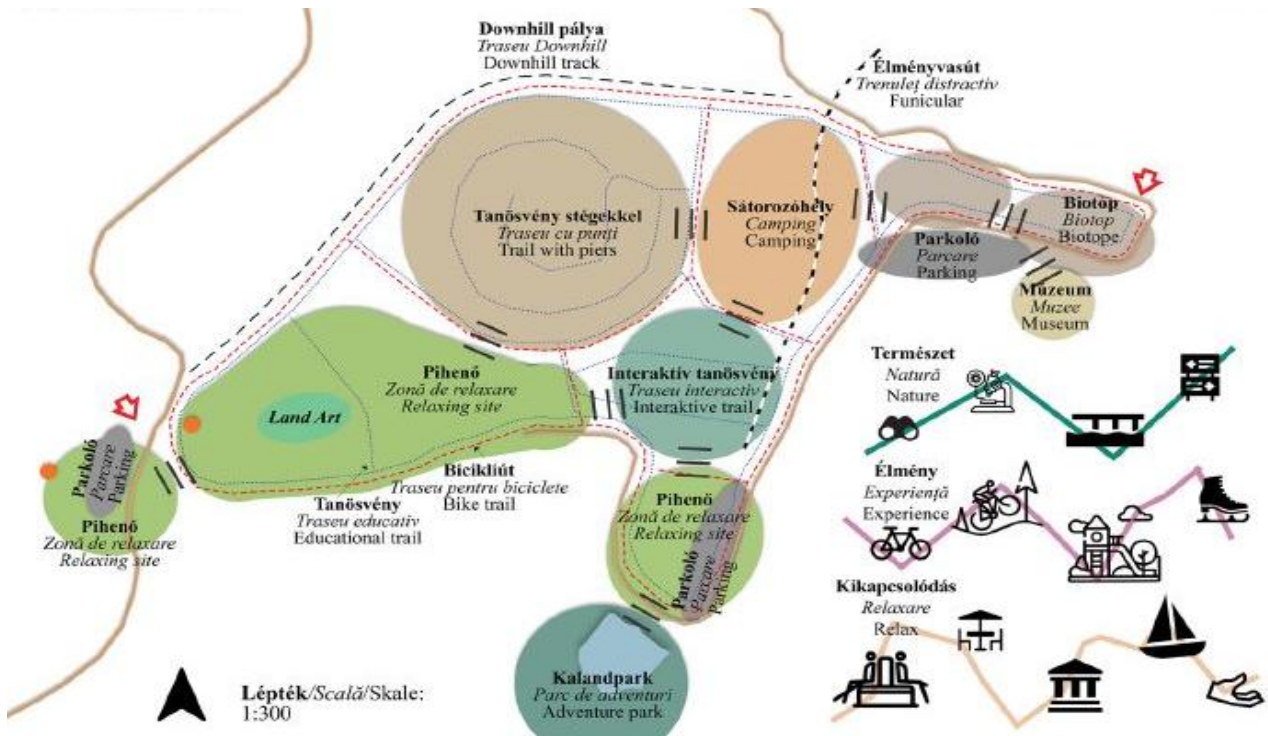


Fig. 11. Function scheme (from students' work, Team 3)

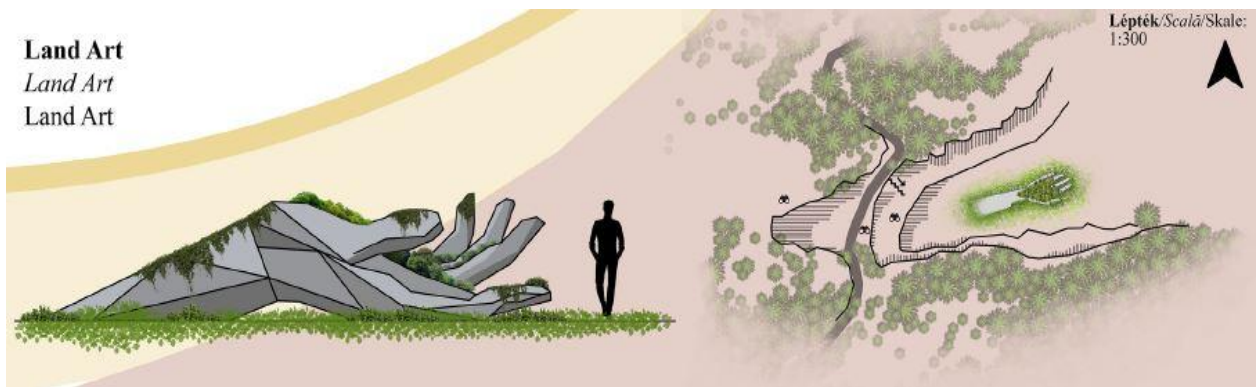


Fig. 12. Land Art, using the materials provided by the area (from students' work, Team 3)

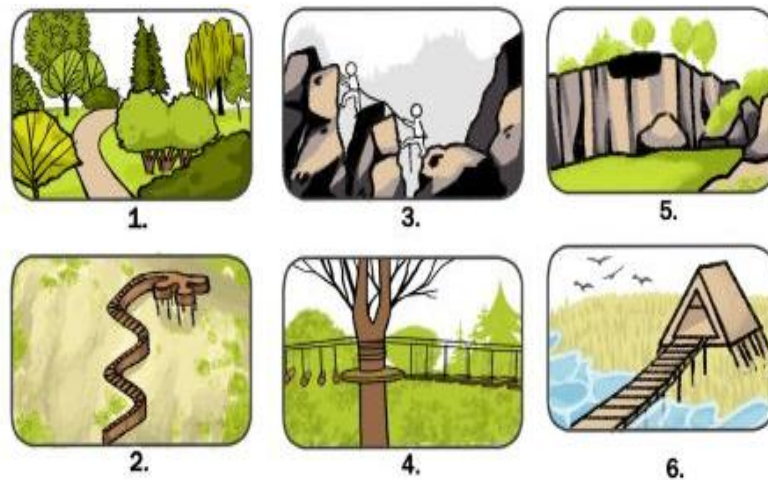


Fig. 13. Post-use proposal (from students' work, Team 4)

4.5. Results announcement, winning team

The project was developed in collaboration with the Harghita County Association, the Harghita County Council, the Mayor's Office of Suseni, the Department of Horticultural Engineering at the Faculty of Sapientia Transylvanian Hungarian University in Târgu Mureş, and the Faculty of Biology and Geology at Babeş-Bolyai University in Cluj Napoca (Maszol.ro, 2022). The award ceremony was attended at Sapientia by Csaba Borboly, the president of the Harghita County Council, who emphasized the importance of the project's focus on proximity to nature. The students examined various possibilities and created proposals for the proper utilization of several hectares of land (Borboly, 2022).

During the awards ceremony, the field work of the participating teams was briefly presented, following which the best proposals were awarded. The competition was highly competitive, with the scores of the awarded teams being very close. The team composed of Andrea András, Róbert Csutak, Erika-Andrea Kálmán, Ákos László, and Kriszta Anna Sándor won the prize for the best application (Fig. 14.). The motto of their concept and post-utilization proposal was "From dust to clean air", which effectively describes the current state of the area characterized by dust, and the desired state of clean air, which could be best provided by nature itself. Their proposal aims to connect the surrounding nature reserves by creating an arboretum-like bridge.

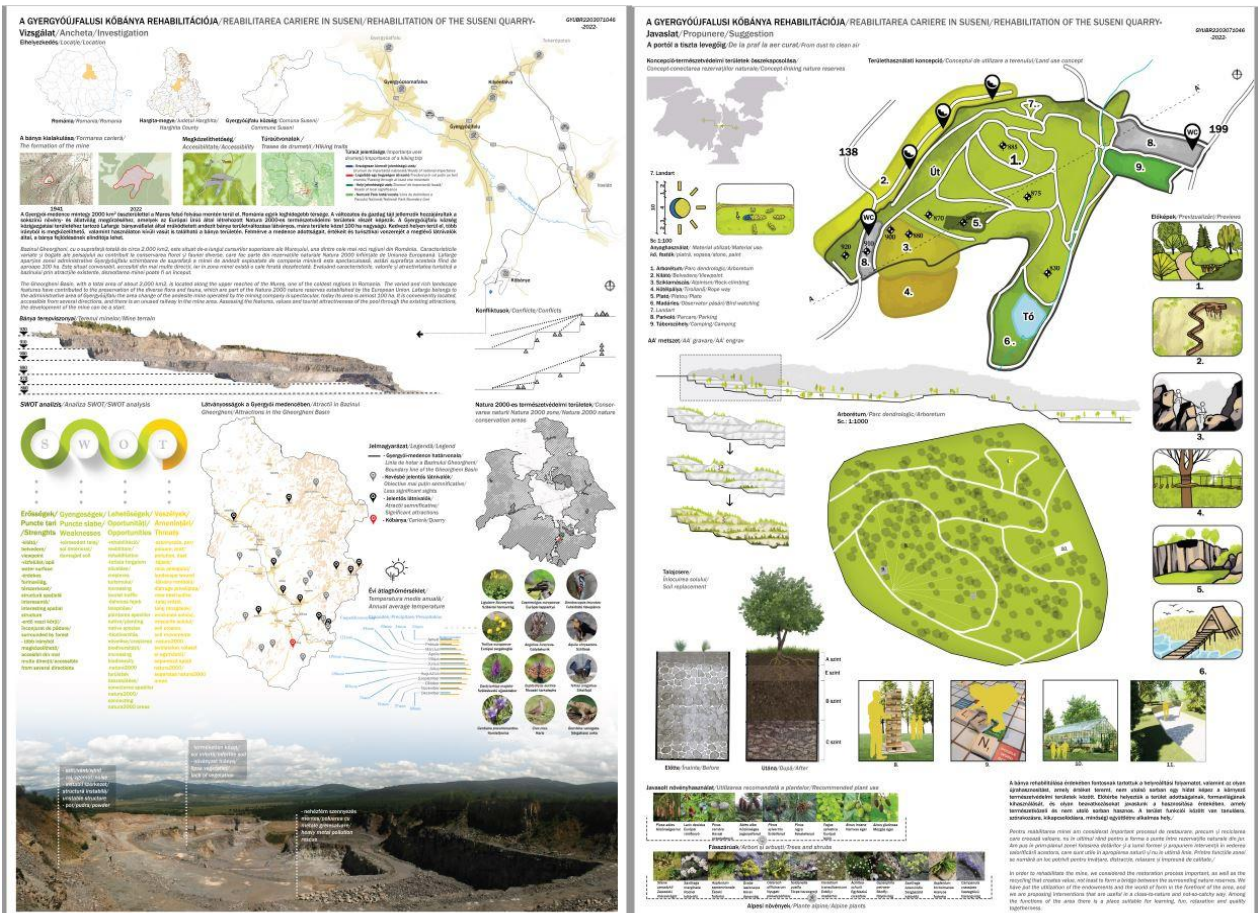


Fig. 14. Analysis and proposal poster of the winning team (from students' work, Team 4)

The second prize was awarded to the group of university students consisting of Anett-Rita Bálint, Zsuzsa Kencse, Laura-Kitty Kopacz, Ráhel Portik-Szabó, and Simó Csenge-Melánia, while the third prize went to the creative team composed of Áron Vitos, Ambrus Adrienn, Orsolya Bálint, Szabolcs Csiza, and Áron Géczy. In addition, a special prize was awarded to the application prepared by Erzsébet Hegedüs, Norbert Köllő, Siklody Szabolcs, Klementina Székely, and Helga Tóth-Pál, as well as the design application devised by Barbara Irisz Dobos, Andrea Izabella Orbán, Mónika Pál, Péter Adrienn, and Péter Bernadett (Maszol.ro).

Conclusions

It's great to see that the competition was successful and that multiple teams were awarded for their proposals. It shows that there were many innovative and thoughtful ideas that could contribute to the sustainable use and revitalization of the mining area. We hope that the winning proposals and ideas will be considered seriously and implemented in the future.

It is important to acknowledge that undergraduate students in landscape architecture and other design-related disciplines have varying learning experiences and thinking styles. Therefore, it is crucial to establish realistic targets that align with their individual capabilities and cognitive characteristics.

Based on our experience, it is of utmost importance to guide students through the entire process and enable them to establish a connection between research and design in their minds. By doing so, they will be better equipped to utilize research findings to support their design proposals and decision-making throughout their career development. This emphasis on bridging the gap between research

and design empowers students to integrate these two elements effectively.

The current design competition serves as an exemplar to underscore the significance of establishing and preserving inter-disciplinary relationships as well as fostering positive communication with local authorities, all of which can be mutually advantageous. Such applications present students with opportunities to professionally test themselves, apply their knowledge and experience in real-world contexts, and cultivate their creativity.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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 15. Team 5 - GYUBR2205231036 - Anett-Rita Bálint, Zsuzsa Kencse, Laura-Kitty Kopacz, Ráhel Portik-Szabó, and Simó Csenge-Melánia