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PAPER

The Nature of Project Management Found in Nature: Comparative Study at High Education Institutions

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ABSTRACT

This research's urgency is evident from the growing gap between students' expectations and what universities are able or willing to provide. The theoretical background is based on constructivist learning theories and a praxiological approach. The parallel group method laid the basis of this study design when comparing project management students from two universities, A and B. In addition, a specific pedagogical experiment in the forest was implemented at University A. The experiment lasted one academic year and included a total of 179 students. Work breakdown structure, the Critical Path Method, resource management, planning, manipulative business practices, and the role of team members were demonstrated in parallel with bees, ants, bumblebees, wolves, zombie mushrooms, squirrels and orangutans. Experimental intervention at University A has led to higher point scores on achievement tests compared to University B students and brought other remarkable findings, "aha" moments and answers to the assigned research questions: What key moments increase student engagement during the class (1), and what are the findings and recommendations for future project management pedagogy (2). This study combines quantitative and qualitative methods, including bio-mimicry analogies, parallel group technique, focus groups, action- and game-based learning, achievement test, and statistical tests.

KEYWORDS

project ecosystem, forest ecosystem, biomimicry, achievement test, focus groups, game-based learning

1 INTRODUCTION

The complexity of today's world requires project managers who can demonstrate depth and creativity of mindset. The new keys to efficiency and prosperity are novel ideas, emotional intelligence, critical thinking, visionary behaviour, the use of personal strengths of project team members and insight [1]–[4]. When looking for a solution to any problem, we can find inspiration in how systems work in nature [5]; patterns are everywhere in the great outdoors and can be observed in structures,

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events, and interrelationships [6]–[7]. Nature is 3.8 billion years ahead of humans, so it would be wise to use this massive stock of "research and development" [8]–[9], such as obtaining and using resources (essential for the project), processing information and reproducing it. Biomimetics (biomimicry) studies living organisms, their structures and composition to imitate their properties and use them to develop new technologies or solutions to current problems [10]. Biomimetics is the application of lessons from nature to people, societies, and organisations, even applicable to project management—while encouraging students to be positive agents of change in the world [11]–[14].

However, the actual situation in the education sector is far from this idea. At most universities, project management is regarded as a subdiscipline and trans-functional discipline at the same time [15]. Organisations, universities, students and professional bodies consider project management as a set of methods, techniques and tools interacting with other fields to bring something new [16]–[18]. This situation responds to the positivist paradigm. Geist and Myers [19] recommend combining hands-on activities with theoretical approaches to project management pedagogy.

Teaching and learning have been identified as significant issues in the debates on the re-evaluation of project management, which is supposed to consist of changes in the conceptualisation of management, a focus on soft skills and the acceptance of the fact that a "one-fits-all" approach is not viable [20]–[22]. Other reasons for the transformation of educational activities are today's "shrewd, knowledgeable and media-savvy" students who have different expectations from higher education than they currently receive. This fact calls for a change in the student-teacher relationship within higher education [23]. Educators need to become coaches and facilitators of learning [24]. Such changes, however, encourage students to extract meaning from interpreting information rather than being passive recipients [25]–[28]. All these challenges led to these research questions:

RQ1: Do forest parallels contribute to increased student engagement and better outcomes?
RQ2: What are the findings and recommendations for future project management pedagogy?

1.1 Research design considerations

Two primary influences shaped the study design: constructivist theories of learning [29]–[32] and a praxiological approach [33]. Teacher-as-researcher implemented an extraordinary pedagogical experiment in the forest to connect learning and practice into one unit. Green spaces of nature provide a neutral ground for shared activities [34]. Environments rich in biodiversity directly affect the outcomes of people engaged in these activities [35]–[41]. The experiment aimed to increase students' engagement and improve their educational results. The following hypotheses were determined.

H0: No difference in point scores between UnivA and UnivB groups will exist.
Ha: Issues explained on forest ecosystem will lead to higher point scores in the achievement test compared to the control group at UnivB.

This study combines quantitative and qualitative methods (bio-mimicry analogies, Focus Groups, parallel groups, and statistical tests).

2 MATERIALS AND METHODS

This empirical research is based on systematic cognitive activity, data collection techniques, and observation of events and processes, followed by processing and interpreting their results. The teacher-as-researcher is also the primary instrument for data collection and analysis. The driving force of the praxeological approach is the experiment, which is carried out to verify the initial assumption's validity. In the pedagogical experiment, at least two parallel groups of students with similar compositions are assumed, and the effect of the intervention is evaluated [42]–[45]. The "parallel groups" method [46]–[47] was used when comparing two groups. This technique achieves more reliable results (compared to the method of one group). The data was collected from September 2021 – June 2022. For one academic year, the teacher-as-researcher focused on working with two selected groups of students at *UnivA* and *UnivB*. Learning objectives and competencies were almost identical.

A project manager-practitioner was also engaged at higher education institutions and supplemented the teacher's explanation with examples of good practices. Standard evaluation and summative assessment were practised at the *UnivB*, where the experiment was not carried out. Instead, the experiment was realised at *UnivA* and was based on action- and game-based learning [48]–[54]. Some project management issues (topics) taught at *UnivA* were moved to the forest environment, where the teacher-as-researcher demonstrated Work Breakdown Structure (WBS), the Critical Path Method, resource management, manipulative practices, and the role of team members in the examples of wild animals. Students worked in five-people teams [55], searching for similarities between humans and wild animals through observation, action- and game-based learning, brainstorming, and mind maps.

The effectiveness of both teaching methods is represented by the knowledge achieved by the students at the end of the experiment, measured by the achievement test [56]–[58]. A criterion-referenced summative achievement test was chosen with broad open tasks requiring a more extensive answer, which are suitable for solving problem situations. The results are shown in Table 1 – Student Performance. When evaluating the responses, weighted scoring was used, assigning different points to the tasks according to their difficulty. The minimum success rate was 60%.

The evaluation of the results differed due to the number of points allocated to individual questions. Twenty was the maximum number of points that could be obtained for each question, with the minimum being four. In the evaluation in the results section, the given range of possible points is then awarded for each question. The character of the assessment corresponded to the ordinal scale [59]. Kolmogorov-Smirnov, Shapiro-Wilk, and Mann-Whitney U tests were used for preliminary data set testing to find possible parametric distribution [60]–[62]. Due to the dual character of the data, it is presented as the median with lower and upper quartiles and the mean ± standard deviation in the descriptive statistics. If students refused to answer the question, this answer was counted as a missing value (not substituted by zero) [63]–[65].

A moderated discussion (Focus Group) was also chosen to explore the participants' attitudes and opinions. The output is usually information that would not appear in the questionnaire; thus, a deeper understanding of the problem is mediated. In addition, group atmosphere can reduce certain stereotypes and attitudinal patterns and

help reveal hidden and subsurface connections that would not be noticed in other types of research [66]–[67]. The experimental group participants were asked the following questions:

- *Which analogy between the project and forest ecosystem do you find most compelling and applicable to the project's teamwork?*
- *Which parallel with the forest ecosystem impressed the most and why?*
- *What animal behaviour is closest to human expression?*

2.1 Selected chapters demonstrated the analogy of project ecosystem – forest ecosystem

The *Work Breakdown Structure* was explained using the example of a beehive. A hierarchical work breakdown structure connects the WBS and the beehive.

Completed projects also require creativity and the use of teamwork strengths. A *project team* is a group assembled for a certain period to achieve a project goal within a set deadline. The team has precisely defined powers and a fixed financial budget. Team members may have different professions and may only meet for the first time at the start of the project, yet they must work together as one body. Team members must be able to communicate and cooperate effectively with each other, which was demonstrated in the analogy of a wolf pack. A pack of wolves includes individuals of various ages and is led by an alpha pair. The pack has strict social rules, which the alpha pair strictly requires of all members. The alpha male ensures tasks and lineage. Beta males are assigned the protection of the pack, which is why these individuals are the strongest and in the best condition. Wolves in a hierarchical position among these individuals are in charge of hunting and caring for the young. The wolf pack is an example of a collaborative, participative or transformational leadership model.

Ants and ground bumblebees (*Bombus terrestris*) discovered the algorithm for finding the Critical Path, which can plan their journey in such a way as to cover as few kilometres as possible [68]–[69]. *Resource management* was introduced to students on fox squirrels (*Sciurus niger*), which have a system for sorting and gathering supplies for the winter; some of them sort nuts according to species, quality and personal taste preferences.

Planning is the dominant yet least popular activity of project managers. To motivate course participants, the behaviour of orangutans was introduced. Orangutans announce their travel plans the night before by calling in the direction of their intended journey.

The course participants were introduced to the alien fungus *Ophiocordyceps unilateralis* attacking ants *Camponotus*. The spores of the fungus invade the ant through the cuticle, enter the nervous system and begin to produce a chemical that controls the ant; its internal organs are converted to sugar so that the fungus can grow better. The ant becomes a puppet, the fungus a manipulator—a pattern of *parasitic and manipulative business practices*.

3 RESULTS

This section presents the similarities found between the project and the forest ecosystem in Tables 1–3 with the student's performance, including achievement tests'

evaluation (median, standard deviation, z-value, and p-value). Achievement tests contain 11 questions, which differ from each other in the number of points according to their level of difficulty. This section also includes selected statements from Focus Group participants.

Table 1. Student performance C (*UnivB*) group (n = 92)

Question No	PM Task	Range	C (UnivB) Group (n = 92)	
			Median (Q1; Q3)	Mean ± Sd
1	WBS (bee hive, anthill)	10 points	6.00 (4.00; 8.00)	7.13 ± 3.42
2	Planning (orangutan)	10 points	6.00 (4.00; 8.00)	5.45 ± 3.83
3	Critical Path Method (ants, bumblebee)	20 points	14.00 (12.00; 16.00)	13.58 ± 4.10
4	Financing (textbook)	10 points	8.50 (4.50; 6.50)	5.45 ± 2.15
5	Project resources (Fox squirrel)	10 points	7.00 (4.00; 6.00)	6.50 ± 4.12
6	Risks (textbook)	10 points	8.00 (2.00; 8.00)	4.82 ± 2.53
7	Changes in projects (textbook)	6 points	2.00 (2.00; 4.00)	2.87 ± 1.23
8	Control methods (textbook)	10 points	6.50 (4.50; 6.00)	4.31 ± 3.28
9	Quality (textbook)	10 points	8.50 (6.50; 4.50)	7.58 ± 2.06
10	Unfair practices (zombie mushroom)	10 points	6.50 (4.50; 6.00)	5.45 ± 3.17
11	Project team (wolfpack)	6 points	4.50 (2.00; 8.00)	3.92 ± 2.83

Table 2. Student performance E (*UnivA*) group (n = 87)

Question No	PM Task	Range	E (UnivA) Group (n = 87)	
			Median (Q1; Q3)	Median (Q1; Q3)
1	WBS (bee hive, anthill)	10 points	8.00 (7.00; 9.00)	8.00 (7.00; 9.00)
2	Planning (orangutan)	10 points	7.50 (4.00; 8.00)	7.50 (4.00; 8.00)
3	Critical Path Method (ants, bumblebee)	20 points	18.00 (18.50; 16.50)	18.00 (18.50; 16.50)
4	Financing (textbook)	10 points	6.50 (6.00; 10.00)	6.50 (6.00; 10.00)
5	Project resources (Fox squirrel)	10 points	8.50 (6.00; 8.00)	8.50 (6.00; 8.00)
6	Risks (textbook)	10 points	8.00 (4.00; 8.00)	8.00 (4.00; 8.00)
7	Changes in projects (textbook)	6 points	4.00 (2.00; 5.00)	4.00 (2.00; 5.00)
8	Control methods (textbook)	10 points	6.50 (8.00; 10.00)	6.50 (8.00; 10.00)
9	Quality (textbook)	10 points	7.50 (6.50; 8.00)	7.50 (6.50; 8.00)
10	Unfair practices (zombie mushroom)	10 points	8.50 (6.50; 10.00)	8.50 (6.50; 10.00)
11	Project team (wolfpack)	6 points	5.50 (4.00; 8.00)	5.50 (4.00; 8.00)

Table 3. Mann-Whitney U test

Question No	PM Task	Range	Mann-Whitney U Test	
			Z Value	p-Value
1	WBS (bee hive, anthill)	10 points	–3.76	<0.01*
2	Planning (orangutan)	10 points	–12.87	<0.01*
3	Critical Path Method (ants, bumblebee)	20 points	–7.18	<0.01*
4	Financing (textbook)	10 points	11.64	<0.01*
5	Project resources (Fox squirrel)	10 points	–6.25	<0.01*
6	Risks (textbook)	10 points	–2.25	0.25
7	Changes in projects (textbook)	6 points	–6.35	<0.01*
8	Control methods (textbook)	10 points	–8.36	0.06*
9	Quality (textbook)	10 points	13.05	<0.01*
10	Unfair practices (zombie mushroom)	10 points	–6.12	<0.01*
11	Project team (wolfpack)	6 points	–3.89	<0.01*

Higher values equal a better result. No differences between groups were found for questions (7) and (9), i.e., risk management methods ($p = 0.25$) and control methods such as Milestones Trend Analysis, Structure Status Deviation, and Earned Value Management ($p = 0.06$). Questions No. (4) and (10) dealing with project financing and quality management have positive z-value = 11.64 and z-value = 13.05, which indicates that in these questions, the experimental group from *UnivA* was significantly worse compared to the control group from *UnivB*.

These phenomena may occur because these four topics were explained and presented to the students from a textbook, not by comparison with wild forest animals. Therefore, the teacher-as-researcher did not find suitable parallels or analogies for the abovementioned issues. Another reason could be that the experimental group (*UnivA*) had already adopted fieldwork in nature and could perceive the return to the classic textbook negatively. On the contrary, nothing changed for the control group (*UnivB*).

Project management is not only about using methods and techniques, but it is a specific philosophy and style of work, representing a particular way of thinking.

It is a remarkable characteristic of humans to quickly understand new unknown facts using analogies (similarities, parallels) with another already known situation [22]. The analogy is a heuristic method of cognition based on structural isomorphism [23], [29]. At the beginning of an analogous situation, there is the nescience of something, which is to be overcome, clarified and enlightened by the previously known content. The effects achieved by this method are enhanced by the synergistic effect of teamwork (on which project management is based) [24]. The backbone of project management is the time-resource analysis of the project based on the Network Diagram, so it is necessary to know the algorithms and logic of its construction. The Critical Path is derived from the Network Diagram and is difficult for students to understand. For simplicity, an analogy between bumblebees and ants was used. The bumblebee does not fly across the meadow along the randomly chosen route. Every day, bumblebees solve a task that mathematicians call the “traveller’s problem”; they must plan their journey to visit all the cities while covering as few kilometres as possible [68]. The secret of ants’ sense of direction lies in counting steps and remembering

successive turns [69]. The WBS aims to break down the project into detailed activities so that responsibilities, effort, and time horizons can be assigned to them [2]. It is a tree-like hierarchical structure similar to that on which the cooperation of bees in a hive and ants in an anthill is based. Unfair business practices, teamwork, resource management and planning were explained using analogies with the natural ecosystem, for which appropriate parallels with forest dwellers could be assigned. In addition, the subsequent research study could explore similarities in project financing, risks, changes, and control methods. Finally, practical recommendations for future project management pedagogy resulting from the results are given at the end of chapter 4.1. The experimental intervention at *UnivA* has led to higher point scores in achievement tests equaling a better mark. Therefore, the statistical test result supported the alternate hypothesis and rejected the null hypothesis.

3.1 Results of a qualitative research survey using focus groups

Focus Groups help reveal certain hidden and subsurface connections that we might overlook in other types of research [66]. For the results of the Focus Groups to be meaningful, it was necessary to let the students express their differing opinions eloquently using direct interaction [67]. Focus Group helped test new ideas, attitudes, values, most remarkable observations, and "aha moments" listed below. Individual agents are marked with the abbreviation A + No.

"Hierarchical position in human and wolf packs has its justified reason and thus ensures the pack's safety, food and well-being. Communication is clear and legible. Wolves can use their strengths, and other team members compensate for their weaknesses; this can be used well in the team as well." (A32)

"Finding food is a matter of economics. It will help if you consume less energy with it than you get from food. The longer you're on the road, the less it pays off. So, does it make sense to look for the shortest path?" (A17)

"I was interested in how the individual elements of the bee colony are perfectly interconnected: the bee colony will disappear without the mother, and the drones and the mother will perish without the workers. The worker alone cannot survive low temperatures, but the bee colony can easily survive severe frosts. Everything is linked together like WBS." (A78)

"Effective teamwork is clear from the wolves' hunting strategy; it is worth analysing the situation systematically rather than blindly chasing prey. Leadership transition, coaching, and mentoring produce well-experienced future leaders." (A65)

"Fox squirrels systematically store their supplies for the winter, sorting nuts according to type and quality. Similarly, the project manager should manage the project resources." (A19)

Focus Groups revealed deeper mind structures and cognitive action of emotions, specifically, how a particular impression affects attention, judgment, learning, and memory. If a specific learning objective was connected with an experience, it was better understood and remembered. It is clear from the participants' statements how students think about a problem, what opinions appear among them and what influences their opinion. The Focus Groups showed what was attractive to the participants and what they considered essential. They understood that time is critical in Project Management, as costs and resources depend on time management. The longer the project lasts, the more expensive it is. The most emotionally powerful was the video experience in which the parasitic fungus *Ophiocordyceps unilateralis* took control of *Camponotus* ants. Students understood that the learning process is

continuous and could not finish in a single course. As a value-add, they also reported reduced shyness, relationship building, creative skills increase, stress, fear, fatigue, sadness or anger reduction.

4 DISCUSSION

The achievement test results indicate higher-point scores in the experimental (*UnivA*) group. It is now possible to answer *RQ1: Do forest parallels contribute to increased student engagement and better outcomes?* Student engagement can be understood as a positive, fulfilling state of mind associated with vigour, dedication and absorption and is manifested by active participation in academic activities and constructive communication with teachers [3], [22], [28]–[30]. An appropriate way to increase students' engagement is to create conditions in which they formulate and present their ideas, let them share their opinion and see how it fits into the surroundings [70]–[72]. Questions can be asked: In your opinion, which part of project management is your strong suit? The question is about *them*. Mass voting activated every student when it was necessary to determine the level of understanding of the whole class [31]–[32]. Voting was done simultaneously to ensure everyone voted and no one slipped by without participating.

The alternation of visual, auditory and kinesthetic teaching styles also contributes to the increase in engagement; the teacher-as-researcher implemented at least one activity for each learning style: illustrating concepts, taking notes, watching educational videos (visual), listening to podcasts, discussions (audial), experiments, movement in the forest (kinesthetic) [71]–[72].

The next step is to let students teach—giving them responsibility for the lecturing part of the curriculum. Sometimes, the teacher broke down the lesson's structure and allowed students to choose how to proceed.

Issues that were explained analogously on parallels with wild animal habits and behaviour, using action- and game-based learning and fieldwork increased the interest and involvement of students. In addition, attractive environments, high levels of immersion in these spaces and how the information is delivered increase the long-term impact on knowledge gained and social values, corresponding with other authors' findings [73]–[80]. Also, the involvement of experts from the project-oriented company and representatives of the employer sphere was desirable for transferring new knowledge from the practice to the higher education institutions and enabling a transition from school to the labour market. An expert from practice presents some topics and complements the interpretation with work experiences and the perspective of company practice [71]–[74].

4.1 Limitations and possible follow-up research

However, this study has limitations that could open future research avenues within a possible longitudinal study.

Pedagogical reality is different from physical or biological reality, and therefore experimentation in pedagogy is much more demanding than experimentation in technology or natural sciences [19], [42]–[45]. Controlling all the components (variables) in a pedagogical experiment is almost impossible because teachers deal with a living organism—a person [46]–[47]. Teaching students in such a way requires the teacher's deep interest and expertise in the life science field.

Focus Groups also have limitations. Dominant individuals can influence the opinion of the rest of the respondents. Some group participants may hide their points of view; conversely, other participants express more radical ideas, while in a personal conversation, they would not appear this way [66]. The presence of certain types of participants in the group will also influence the speech and opinions of others. The data obtained are also more demanding to analyse [67].

The Kolmogorov-Smirnov test also has several limitations: It is suitable for assessing differences in the composition (structure) of two groups. It is applicable in the case of so-called continuous random variables. However, when this test is applied to discrete random variables, its efficiency drops significantly: the Shapiro-Wilk test only works well in samples with many identical values [60]–[62].

This study is not a finished product - nor should it be given the constant research and development in the market. Some elements of the program—particularly fieldwork in nature—will require more time to achieve the appropriate level of effectiveness. Nevertheless, as the program matures, course content and methodology will continue to grow and evolve.

This paper aimed to compare the effectiveness of standard and experimental methods and approaches. Further research could encompass more parallels with nature and involve more participants, preferably from ten different public or private universities. It would create a reliable experimental plan where the results of all students taught by one method would be compared with those of all students prepared by the other method. However, this meta-analysis would be demanding to implement in practice.

Prior research studies using analogies with forests were minimal and focused on business economics [81]. This limitation is a challenging opportunity for further project management development. In addition, several research papers deal with the teaching methods of project management [1], [15], [19], [24]–[26]. Nevertheless, the purpose of this study was, among other things, to fill the gap with empirical research that would look at things through students' eyes.

4.2 Future project management pedagogy

Now it is possible to answer *RQ2: What are the findings and recommendations for future project management pedagogy?*

The student perspective should be considered in future pedagogy contexts within the discipline. The transformation should encourage the exchange of ideas between students and those who teach by involving the analogy method in daily education: showing examples from the great outdoors, how to manage resources, work together as a team, and how planning and looking for the shortest (i.e. cheapest) route pays. Let group dynamics work, shift the relationship with students as learner-centred, and teach students to use the proper techniques and tools for the right purpose. Lead them to understand that the project is intended to deliver a valuable product to the organisation that funds it. Processes and mechanisms of technology are the only means to achieve the goal. Students must understand that clearly defined roles and responsibilities of team members are essential; they learn to plan step by step and manage the project in stages. Students should be encouraged to look at the "big picture" and understand how the parts and pieces that make up the whole interact and influence each other. It is crucial because some of the biggest challenges facing our world today are the product of systems failure and require a systems approach to solutions.

The added value of nature-based activities is that students strengthen their relationship with green spaces and drive characteristics of self-efficacy, determination

and independence, a sense of belonging to the community, tolerance and respect. This interaction and the cooperative feature of activities lead to increased social inclusion, lower isolation, greater trust, reciprocity, connectedness and social cohesion [34]–[36]. In line with transformative and social learning theories, educators must facilitate project management students to become co-creators rather than simply recipients of knowledge [19], [22]–[23]. Such requirements call for an emphasis on broader educational experiences. Changes in the institutions where project management is taught are also desirable. For example, educators need to adopt a different way of teaching by allowing engagement in project modules where students can become proactive problem solvers involving critical thinking. In addition, higher education institutions need to change their business models by supporting flexible learning, preparing students to meet real-world problems [82] and integrating them into the curriculum [83]–[84]

5 CONCLUSIONS

This research's urgency is evident from the growing gap between students' expectations and what universities are able or willing to provide [85]. Therefore, the learning objectives of the project management course are focused on tools and techniques to master the life cycle and procedures of planning, initiation, evaluation and termination of the project, time-resource analysis, risks, changes and control mechanisms. Although the objectives can be achieved through various methods, the research design of this study is based on parallels between the project ecosystem and the forest ecosystem. The rationale for this idea is that our world is made up of systems—from ecosystems in nature to organisations and technologies in human society [9]. Moreover, systems consist of interacting parts and relationships between those parts. Therefore, systemic thinking means considering the whole and its interacting parts in context [10].

The link to *RQ1,2* is as follows. First, the experiment revealed that if a specific learning objective was bound up with experience, it was better understood and remembered. The most emotionally powerful was the video experience in which the parasitic fungus *Ophiocordyceps unilateralis* dominated the *Camponotus* ants. Therefore, the students scored much higher on the unfair business practices in the achievement test than their colleagues from the parallel (control) group. Second, the more students observe from nature how to use resources and constraints, the better equipped they are for managerial practice. Third, the outdoor environment is informal [34]–[35], offering more suitable conditions for students to formulate and present insights and observations. Everyone could contribute their opinion and see how it fits into the group's atmosphere. Finally, issues explained analogically with parallels with forest dwellers increased student interest and engagement.

Recommendations for future project management pedagogy are based on the study's findings and designed in a flexible, multimodal methodology to meet a wide range of students' learning objectives and educational needs. This paper's results could be relevant for policymakers and stakeholders to develop successful strategies. Interpersonal skills are increasingly crucial over technical skills and their possible influence on managing complex oscillations within projects [86]. However, a particularly beneficial finding from this study is that those who need to learn such skills (students) accept this reality. In addition, this study identified the need for higher education institutions to rethink their way of integrating transferable skills into the educational agenda at all levels, full potential in educating students in line with their expectations and the growing demand for university education at a global level. Finally, this experiment proves that training people according to naturally inspiring principles that have worked for billions of years on earth makes sense.

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