

- when listening to audio or video material, in case of an anxiety signal a teacher should send the records' transcripts to the students and they will listen to them individually.

To sum it up, class planning shouldn't take much time. It must help predict specific problems and increase your readiness to react to them. Also in time of uncertainty it's essential to create classes-transformers: they can be applied to unexpected cases.

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KNOWLEDGE MANAGEMENT IN SUSTAINABLE CONSTRUCTION PROJECTS

The construction project management system provides for the presence of a "solid foundation" of knowledge, which includes technical rules and standards of construction, BIM technologies, and project management standards. The modern development of the construction industry is based on the principles of environmental friendliness, frugality and people-orientation. Turbulent environmental conditions, energy resource limitations become catalysts for the development of knowledge and paradigmatic changes in the management of construction projects. Considering the results of the study "Green reconstruction. Post-war green recovery of Ukraine" [1] Ukraine can become a European leader in green transformation thanks to "green" knowledge and solutions in construction.

Decisions on the integration of some Sustainable Development Goals (SDGs) into the construction project management system are being developed. The context of sustainable management of construction projects is not limited to the use of ecological ("green") technologies [2–3]. Health, safety, security, as well as trust in decision-making procedures are important for the management of construction projects in the parameters of sustainable development [4–5]. Sustainability is

considered through the application of management processes that, in addition to the traditional tasks for construction projects, also outline the tasks of a wider context. In the work [6] a correlation method was applied to determine the interdependencies of the characteristics of the use of tools and methods in the processes of managing construction projects with the values of sustainable development 5P (Product, Proses, People, Planet, and Prosperity). Instead, there is a need for systematization and effective knowledge management for sustainable construction project management.

It is known that the main knowledge system for construction project management is “A Guide to the project management body of knowledge Construction” [2], which is an extension of PMBOK (Sixth edition, 2013). In the list of construction project management knowledge areas, in addition to integration management, scope management, schedule, cost, quality, resource, communications, risk, procurement, and stakeholder management added the following: “project health, safety, security, and environmental management (HHSE)”; “Project financial management”. PMBOK (Sixth edition, 2013) has 49 processes and PMBOK Construction [2] has 54 processes. At the same time, PMBOK (Seventh edition, 2021) underwent radical changes in the knowledge system of project management. The new version of the standard [3] is based on “principles of project management” and “project performance domains”.

In [2], it is considered that “knowledges” are expert knowledge:

- *Constructability Review*. A review performed by personnel with expert knowledge of projects for purposes of assessing or determining whether the work can be performed with available, whether specialists are required, or (whether an alternative design is required);

- *Integrated Project Delivery (IPD)*. A project delivery method that integrates people, systems, business structures, and practices into a construction project contract process that combines the expert knowledge and skills of participants to optimize efficiency through all phases of design, fabrication, construction, and project cost/schedule and often including the waste reduction.

Instead, in PMBOK (Seven edition, 2021) [3] “knowledge” is defined as a *mixture of experience, values and beliefs, contextual information, intuition, and insight that people use to make sense of new experiences and information*. In addition, the context of “knowledge” is contained in terms such as:

- *Explicit Knowledge*. Knowledge that can be codified using symbols such as words, numbers, and pictures;
- *Tacit Knowledge*. Personal knowledge that can be difficult to articulate and share such as beliefs, experience, and insights;
- *Lessons Learned*. The knowledge gained during a project, which shows how project events were addressed or should be addressed in the future, for the purpose of improving future performance;
- *Lessons Learned Register*. A project document used to record knowledge gained during a project, phase, or iteration so that it can be used to improve future performance for the team and the organization;
- *Forecast*. An estimate or prediction of conditions and events in the project’s future based on information and knowledge available at the time of the forecast;
- *Schedule Forecasts*. Estimates or predictions of conditions and events in the project’s future based on information and knowledge available at the time the schedule is calculated;
- *Information Radiator*. A visible, physical display that provides information to the rest of the organization, enabling timely knowledge sharing;
- *Program Management*. The application of knowledge, skills, and principles to a program to achieve the program objectives and obtain benefits and control not available by managing program components individually;
- *Project Management*. The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements.

As a rule, a new version of PMBOK Construction was published 2 years after the basic version of the PMBOK, so we are waiting for a new version of PMBOK Construction in 2023.

The GPM Global P5 Standard for Sustainability in Project Management offers a kind of harmonization of the main results of the project (quality, cost, scope, time) with the factors of its environment (social, economic, environmental aspects), as well as processes, products and their relationships [4]. In this standard, the acquisition of “knowledge” is provided through organizational learning. This element covers the policies, procedures, and practices needed to support both knowledge management and knowledge creation throughout the project. Knowledge of sustainable development allows to ensure the achievement of sustainable results: enhanced capabilities throughout the organization; increased efficiency and effectiveness in projects; opportunities for improved industry standards.

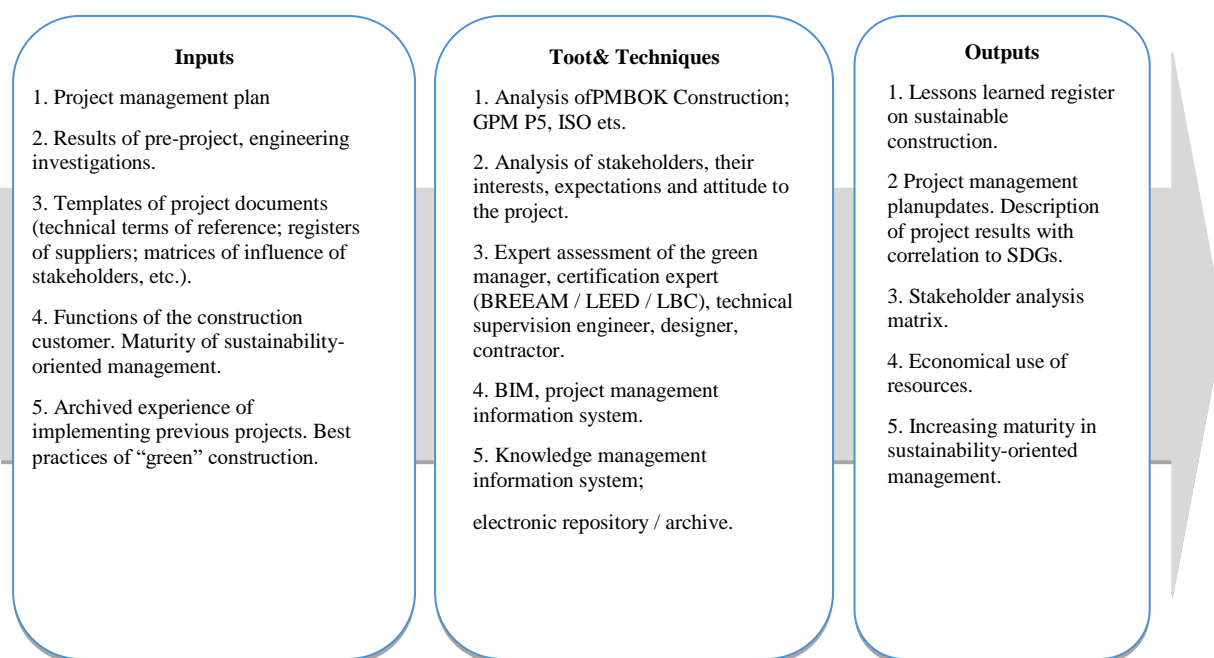


Figure 1. Information model of the process of “Knowledge management of a sustainability construction project”

Also, GPM Global P5 provides for local competence development as an element of Quality education (Goal 4). It is important that all stakeholders of construction projects have the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and

sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

Knowledge management for sustainability-oriented construction projects can be built by integrating project management standards (PMBOK, PMBOK Construction, GPM P5, ISO etc.) and establishing a correlations with all SDGs. This process is performed throughout the project life cycle. The information model of the process “Knowledge management of a sustainability construction project” can be represented by “inputs”, “tools & techniques”, “outputs” (Figure).

Knowledge about sustainability-oriented construction project management is not always “tacit”, but this knowledge is the knowledge that is personal and difficult to express, such as beliefs, insights, experience, and “know-how”. In practice, knowledge is shared using a mixture of knowledge management tools and techniques (interactions between people) and information management tools and techniques. An important part of knowledge management is creating an atmosphere of trust so that people are motivated to acquire new sustainability competencies and share their knowledge.

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