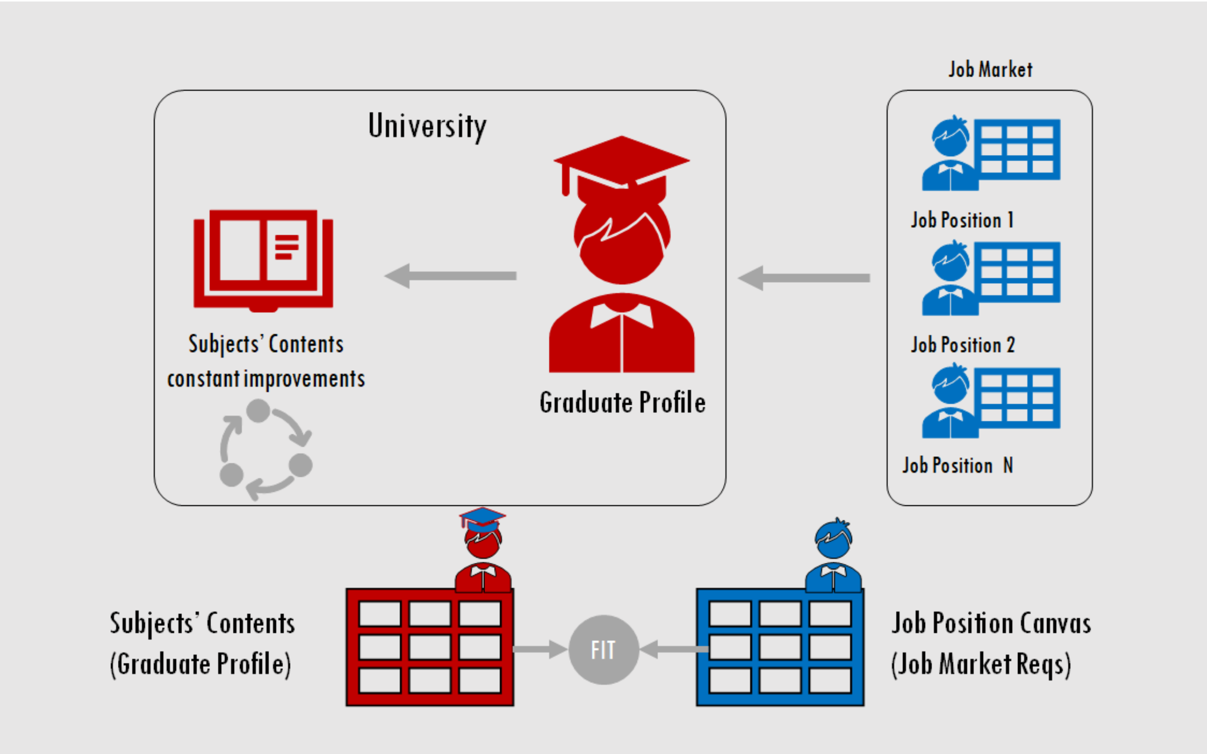
Job Positions Canvanizing Body of Knowledge Guide



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Introduction

The *Guide to Job Positions Canvanizing Body of Knowledge* is an attempt to provide universities with a structured approach to agile planning, improvement, and validation of educational offerings. Nowadays universities are complex organizations, and the educational market has become a very dynamic and competitive environment. Employers no longer look only at the certificates confirming formal education. More often skills and knowledge areas of prospect employees are verified based on how much they comply with real needs of specific occupations. Employability of graduates and fit between learning outcomes and job market needs as well as innovative educational offers are now the source of the value added. Universities that constantly improve *educational value proposition* can gain and sustain their competitive advantage. However, it is a demanding task as in complex organizations, which without a doubt universities are, there is a high level of inertia. Therefore, having an approach that enables university stakeholders to create and improve educational value proposition in an agile, student-centric and job market oriented manner may be a strategic weapon.

This is the first version of *Job Positions Canvanizing Body of Knowledge Guide,* and it needs testing and improvements based on *lessons learned* and *retrospectives*. However, it is considered as a starting point for *Agile Move* universities can undertake in order to sustain their important role in the formal education domain and increase graduates employability and marketability.

Purpose of the Job Position Canvanizing BoK Guide

The purpose of *Job Positions Canvanizing Body of Knowledge Guide* is to provide universities' stakeholders (*University Educational Staff, University Management Staff, Career Offices*) with a framework for educational offer planning and improvement. This should translate into higher employability of university graduates as well as constitute the foundation for increasing students' awareness with regard to education track job market attractiveness.

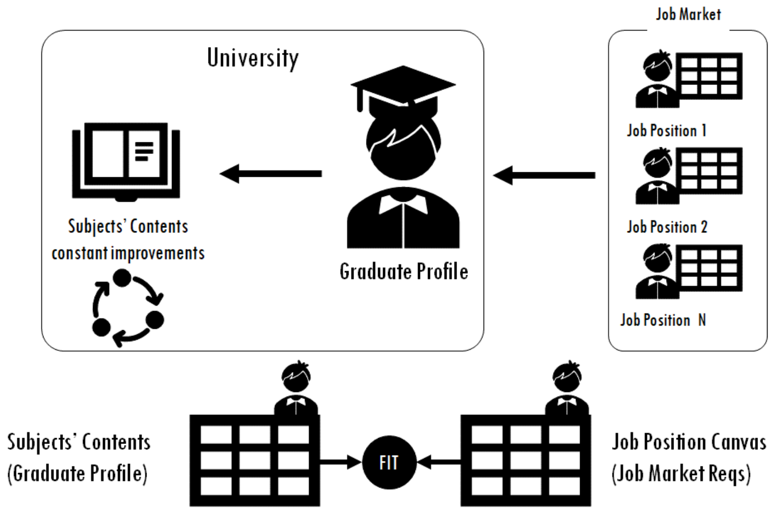


Figure 1. The process of educational offer improvement

All the *knowledge areas* and the *tasks* presented in this guide are focused on constant improvement of educational offer with regard to real job market requirements. It can be done in a disciplined manner based on careful analysis of the job market and university educational offer current state, finding the gaps that exist between labor market requirements and learning outcomes and finally getting the best possible fit. All tasks may be supported by a set of techniques that can be used in the process. The recommended techniques have been described in the form – *why the technique should be used?*, *what should be done?* and *how to use the technique for a specific purpose?*. The guide does not impose specific *project management methodology*. Every university can use its own approach to project management. However, because of high dynamics of job market and required university educational offer fast changes *Agile Approach* is recommended.

Target Audience of JPCBoK

Target audience includes such groups of stakeholders as *Teaching Staff* of the universities, *Universities Management Staff* and *Career Offices Workers*.

What is Canvanizing?

The *canvanizing* is the process of creating *one page description* of specific area in the form of canvas. In this guide the canvas is used to better understand real market requirements related to job positions most important from the perspective of university educational strategy. Occupations are identified based on Job Market Research which provides detailed characteristics used for canvanizing. *Business Model Canvas* technique developed by *Osterwalder* and *Pigneur* has been adapted for modeling job positions in the form of *Occupation Business Models Canvas* (see *Techniques* section). An approach taken enables to better understand the organizational context of specific occupation including typical tasks done, required skills, abilities, character traits, knowledge areas, value proposition that is created, channels used to deliver value, recipients of value created and other job positions involved in the business processes to get the jobs done. Such understanding may be beneficial for different stakeholders involved in the process of education offer constant improvement – *University Management Staff Members*, *Teaching Staff*, *Career Offices Workers*. Every stakeholder group will get specific benefits. The most important have been summarized below.

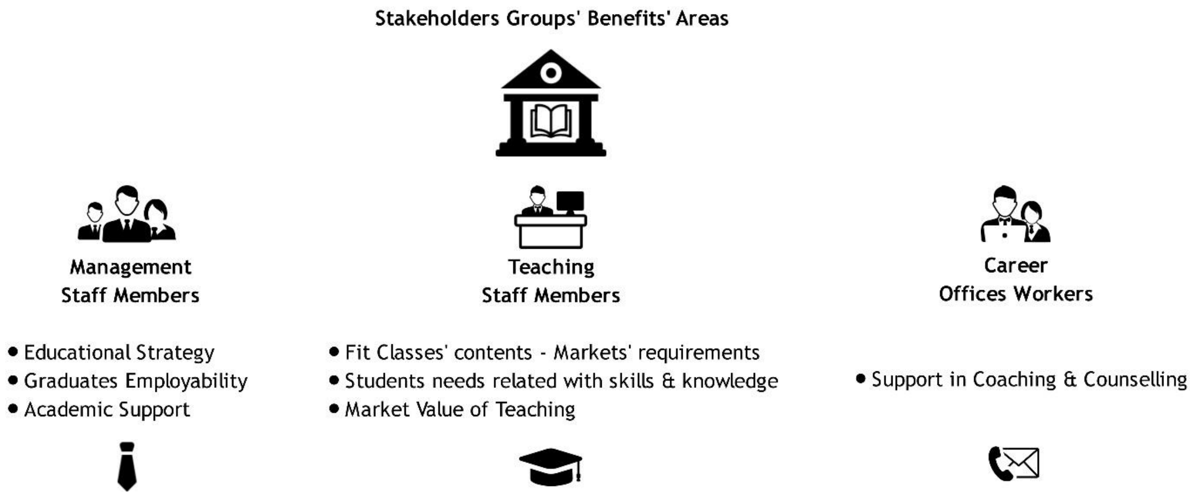


Figure 2. Benefits for university

University Management Staff Members can use the approach in the following areas:

- ***Educational Strategy Planning and Revision.*** Having clear view of job market requirements enables to better plan educational offer and constantly improve educational strategy.

- ***Graduates Employability Improvement.*** The fit between educational offer and job market requirements may significantly improve an employability of university graduates.
- ***Academic support.*** Deep understanding of how job market situation looks like with regard to most attractive occupations and required skills & knowledge should facilitate students' progress through their academic programs close.

University Teaching Staff Members can apply the following use cases of the approach:

- ***Better fit between contents of the classes and real market requirements.*** The *Occupation Business Model Canvas* developed for job positions for which specific classes are important enable to validate the contents and scope of the classes with specific knowledge areas and skills on the job market.
- ***Better understanding of students needs related to personal resources in the area of skills and knowledge***. By providing students with *Business Model Canvas* related to different possible occupations where classes content is a core and getting a feedback from students enable better selection of educational stuff and improved tutoring of students what will make them more and more aware of their professional identity. Based on skills and knowledge areas students report to have improved, it is possible to dynamically personalize the classes content according to group's specific needs connected with professional identities of group members, however this will require flexible template design for subjects.
- ***Better understanding of job market value of teaching stuff, classes contents.*** Having Business Model Canvas for job positions related to specific subject it is possible to determine the market value of teaching stuff and improve the classes forms and contents with regard students' personal resources development.

Career Offices Workers can gain the following benefits from using the approach:

- ***Improved support in coaching and counselling students*** in such areas as: discovering professional identity, career development, job market requirements, selecting occupation that fits professional identity of students, graduate profiles analysis, design, re-design and development, finding options for additional trainings and courses.
  - Visual thinking tools such as Business Model Canvas enable to clearly present to students the requirements set by the labor market in a persuasive and attractive way.
  - Having a catalog of Business Model Canvas for various occupations, simplifies the process of finding the best fit between the students' personal resources and the available job offers.
  - Business Model Canvas may be used as market requirements elicitation tool during the meetings with employers and support the process of collecting information about missing elements important from the employers' point of view. This can improve the correlation between educational offer and real job market requirements.
  - Business Model Canvas can be applied with other standard tools used by Career Offices as a complementary technique.

It is worth emphasizing that the scope of this guide is much wider than canvanizing itself. It presents a comprehensive approach where canvanizing plays a crucial role in educational offer constant monitoring, analyzing and improvement processes. Therefore a deep understanding of canvanizing, the ways it can be used in connection with other techniques presented in this guide, and how to canvanize is very important.

Techniques

Provide means to perform canvanizing tasks. The techniques described in the JPCBoK Guide are intended to cover the most important techniques that will help in the process of eliciting, specifying and management of educational requirements.

Perspectives

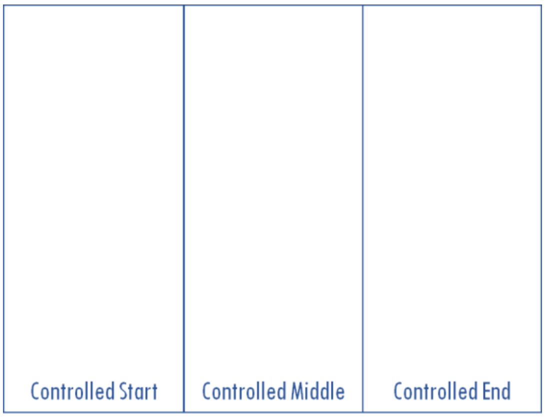
Describe various views of job market requirements analysis. Perspectives help different stakeholders working from various points of view to better perform tasks, given the context of the initiative.

Knowledge Areas & Project Management

Educational Offer Improvement as a University Project

An educational offer improvement initiative introduced for the first time within the University can be successfully planned and implemented using project management methodologies, tools and techniques. The traditionally accepted project management standards can be adapted to support improvement initiative planning, implementation, and assessment processes. Improvement initiatives are viewed as activities to be conducted by chosen teams to improve processes and systems around adjusting educational offer to the requirements of the labor market.

Every project has a beginning, a middle phase during which activities are implemented, and an ending. Taken together, these stages represent the generic project "life cycle."



Considering this kind of initiatives as a project/projects and use of project management techniques for executing improvement initiatives provides following benefits to University:

- the scope of work can be broken down into more manageable elements,
- realistic schedule can be developed to control the individual elements of the scope,
- the risk connected with the improvement initiative could be identified, analyzed and then response strategies can be developed,
- responsibilities of those involved in selected areas of improvement activities can be assigned to be sure that the all work will be implemented and the project goals can be achieved,
- Improvement tasks implementation can be traced with use of project schedule and project budget.

Controlled Start

The controlled start includes the pre-project activities where the objectives of the initiative (project) are identified. University should define the aims of the improvement initiatives that respond to its need.

Before making the decision if the initiative is worth implementing the University should prepare a business case that outlines the why's, what's, how's. It should answer the question of what are recommended solutions as well as what are expected benefits of the proposed improvement initiative. It should also cover identification, authorization, and commitment of funding for the improvement initiative.

At the end of a controlled start phase should be finalized:

- the improvement initiative scope

- the business case and justification
- the financial analysis
- the information management strategy
- the stakeholders engagement and management strategy
- the project team should be ready to work under the project.

Controlled Middle

Controlled middle phase, also called the project execution phase is usually the longest phase in the project life cycle. During this phase the project team constituted in the frame of controlled start phase carries out all the activities planned in project schedule and creates outputs as outlined in the project plan. The project tasks should be delegated to each team member making them responsible for a small part of the project.

Main person who is responsible for managing the improvement initiative is called project manager and her/his job is mainly managing people, managing processes as well as managing communication with different stakeholders.

The activities that happen during the *Controlled Middle* phase:

- Implement the activities in project scope.
- Track project progress with regard to the schedule and the budget
- Manage the team's work and motivate team members.
- Undertake the corrective actions as a response to need for change to the project plan
- Manage communication with different stakeholders.
- Document all lessons learned.

In the implementation phase, it is worth using project management tools that will support cooperation within the project team. Depending on the university's experience in project management, it may choose less advanced tools, intuitive to use or more sophisticated, directly dedicated to the project management process. Examples of tools/software that can be useful in project implementation are:

- Ms-Excel sheets
- Shared documents on Google drive
- Trello boards
- Gantt Project software
- MS-Project

Controlled End

The closing phase gives the opportunity to review and evaluate the project results, which is crucial for transforming initiatives related to educational offer improvement into a well-structured and managed University process. This is the stage where outputs are finalized and approved. The project controlled end ensures that all tasks have been executed according to the project plan and all deliverables have been approved.

Controlled end phase ensures that the final beneficiaries of improvement initiatives (Rector, deans, professors etc.) have the information and resources to successfully implement and use project output. In the frame of this process, project manager should obtain approvals for the project deliverables with official sign-offs from the project stakeholders.

To gain the knowledge and experience for future activities, a project review should be done. The successes, failures, challenges and opportunities for improvement should be reviewed. For the drafting of the project final report the following techniques/tools could be used:

- interviews with the stakeholders also project team members,
- surveys and questionnaires
- brainstorming sessions

The findings of review should be included in a final report that consist of:

- A summary of the project execution and description of goals that have been achieved.
- Details on the project performance.
- Details on the deviations from the planned budget and schedule.
- A list of risks and chances that influenced the project outputs.
- A description of the benefits that the project will provide.
- A description of what has been learned – lessons learned.
- Annexes containing important project documents (the project plan, the final project approval).

Educational Offer Improvement as a Process

To sustain high quality of education processes and achieve the best fit between graduates' competencies and job market requirements, all the activities related to *educational offer improvement* should be finally transformed into well-structured and managed university processes. Because of the high level of risk involved in every cross-university initiative, it may be reasonable to conduct the tasks recommended by this guide on a small scale in the form of a pilot project. Such a pilot project may be related to a specific major or on a bigger scale the whole faculty. After the pilot project(s) is successfully completed and lessons learned collected, all the tasks may be gradually transformed into a university process that will be defined, managed and constantly improved. The transition will require definition of the following key elements of the process:

- Events that are related to process start and process end.
- Activities that will be carried out in the frame of the process.
- The flow of control that defines the relationships between activities. In what order the activities will be done? Which activities are carried out sequentially and which in parallel?
- What the activities need as an input and what they will produce as an output?
- Decision nodes in the process. In which places the decisions have to be made? What are possible alternatives the process can branch to? What are the conditions that have to be met to select every alternative?
- Who is responsible for specific activity? How are the activities done with regard to university organizational structure? What university actors (Departments, Roles etc.) are involved in the process?
- Intermediate events that may occur during the process.

These elements properly defined may enable process standardization and knowledge management. Having process models in place may also support the improvements done in the context of other university processes and communication with stakeholders.

JPCBoK Knowledge Areas

Knowledge areas represent areas of specific educational offer improvement expertise that encompass several tasks. Each task in the JPCBoK Guide is presented in the following format:

- Description
- Outputs
- Guidelines & Techniques
- Stakeholders

The knowledge areas in generic project framework

The five knowledge areas have been described below and have been shown in generic project management framework.

Graduate Profile Development Planning & Monitoring

This knowledge area describes the tasks that person(s) responsible for the educational offer improvement initiative perform to organize and coordinate the efforts of all the stakeholders involved. These tasks produce outputs that are used as key inputs and guidelines for the other tasks throughout the *JPCBoK Guide*.

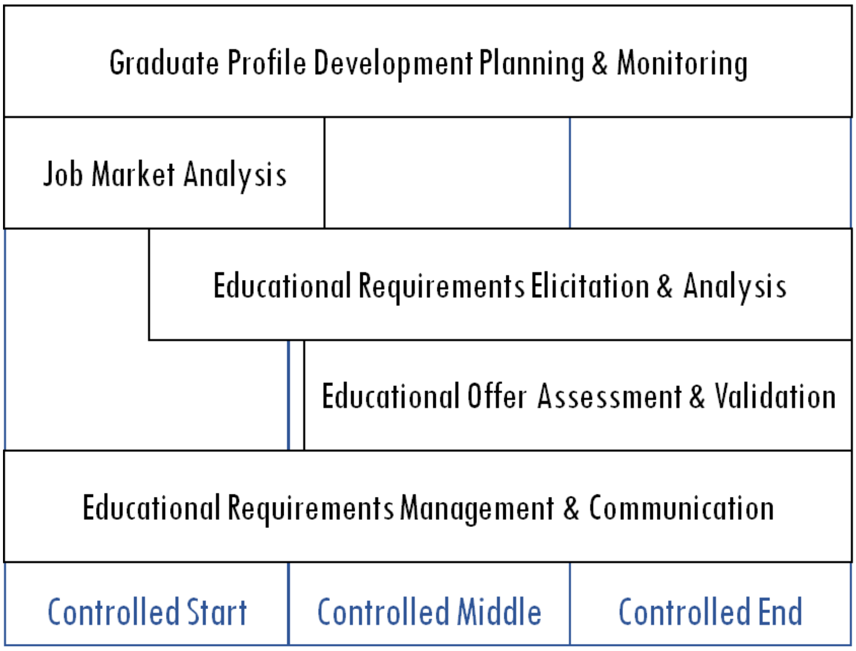


Figure 3. The Knowledge Areas of JPCBoK in project framework

Job Market Analysis

This knowledge area describes the tasks that are performed to prepare for and conduct elicitation activities and confirm the results obtained with regard to the labor market. It also describes the communication with stakeholders once the information is assembled and the ongoing collaboration with stakeholders throughout the analysis activities. This area encompasses activities related to preparing the list of job positions related to selected education areas, job positions requirements elicitation via communication with *Career Offices*, *Employers*, *University Staff Members and on-line research.* It also includes guidelines for job positions requirements modeling and analysis. The tasks results obtained will be used as an input during gap analysis.

Educational Requirements Elicitation & Analysis

This knowledge area describes the tasks conducted to prepare for elicitation and analysis activities with regard to educational requirements. It requires to undertake many analytical tasks such as analysis of current state of university documentation (graduate profiles, study programs, syllabuses), analysis of formal educational requirements and benchmarking of other universities educational offerings. Then learning outcomes in their current form and state (AS-IS) are analyzed. Analysis can be supported by modeling of graduate profiles. Finally graduate profiles are mapped into job positions and a list of items for gap analysis is developed.

Educational Offer Assessment & Validation

The tasks to be done to assess the performance of and value delivered by an educational offer of the university have been described in this knowledge area. It also provides the recommendations with regard to removal of barriers or constraints that prevent the full realization of the educational value proposition. The tasks are focused on Lessons Learned (if they already exist), preparing the assessment and evaluation criteria, development the final content for gap analysis and conducting it, graduate profiles development, preparing the list of planned improvements, their financial analysis and final assessment done by University Management Staff Members. All the tasks are required to prepare and assess the plan for transition of university educational offer from current state to desired, ideal state.

Educational Requirements Management & Communication

This area targets managing and sharing the solution scope and the project requirements with the project stakeholders. This is where the team implements and refines the communication plan. On projects with a wide scope, stakeholder audiences can be quite broad and diverse. The tasks in this area constitute the vehicle to accumulate and share all or part of the project requirements with stakeholders. All the changes planned must be effectively and efficiently communicated to all stakeholders. The communication should support building the university culture oriented on change, innovation and high education quality driven by employability of graduates. Tasks included in this knowledge area regard preparing the repository for job market requirements and university data, management of up-to-date repository contents, monitoring the fit between job market requirements and educational offer, periodic improvement of educational offer, communicating requests for change to University Staff Members and students.

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Graduate Profile Development: Planning & Monitoring

University

GPD Team

► Stakeholders Engagement ► Definition of Objectives ►

Stakeholders Engagement Plan

- Tools
- Communication methods
- Engagement frequency
- Audiences' identification

Risk Management Plan

- Foreseeing of Risks
- Estimated Impacts
- Responses' Definition

Monitoring & Improvement Plan

Performance Assessment Plan

- Assessment methods & Data Sources
- Link Evaluation methods - Objectives
- Responsible Staff for evaluation
- Timeline of the various Stages

Graduate Profile Development Planning & Monitoring

Scope

Before any activity related to educational process improvement could start it should be planned and proper acceptance criteria set up. This knowledge area describes the tasks that person(s) responsible for the initiative performs to organize and coordinate the efforts of all the stakeholders involved. The main focus is on stakeholders' identification, analysis and involvement, risk management and monitoring planning. The tasks conducted in this area will provide outputs that are used as key inputs and guidelines for the other tasks throughout other knowledge areas.

This knowledge area includes the following tasks:

- Planning a Team and Stakeholders Engagement & Communication
- Planning Risk Management
- Planning Monitoring and Improvement

Tasks

Planning a Team and Stakeholders Engagement & Communication

Any initiative implemented by the university requires the involvement of human resources. The project team includes the project manager (the person who will coordinate the process of completing the various tasks) and the group of people who work together on the initiative to achieve its goals. The people implementing the initiative should be assigned to the team taking into account the key competencies required to complete the tasks.

In order to ensure the best results from the initiatives that are going to be implemented to ensure better fit of the university's offer to the requirements of the labor market, it is crucial to identify stakeholders and plan their engagement. Stakeholders are individuals or groups of people who have expectations towards the university or its processes and activities. Stakeholders may include university owners, university authorities, teachers, administrative staff, managers, students and various organizations and individuals from the university's environment.

Stakeholder engagement will allow the university to consider the needs and requirements of individuals and groups who will be directly or indirectly involved in the implementation of improvement initiatives. Stakeholder engagement will be a key enabler for knowledge transfer and delivery of quality products. Process of development of a stakeholder engagement plan should begin with mapping stakeholder groups. This will help the university to make the best use of resources by avoiding over-communication with groups that don't require as much attention as high-interest and high-impact groups. The first step is to group stakeholders into one of four categories:

- Low interest and low impact - in case of this stakeholder group, one-way communication of relevant information will be a sufficient strategy.

- Low interest and high impact - this stakeholder group will require regular monitoring and communication of key information and anticipate any interests or needs they may have.
- High interest and low impact - this stakeholder group will require regular, intensive two-way communication.
- High interest and high impact (these are the KEY stakeholders) - this stakeholder group is both interested and influential. This is a priority stakeholder group that will require regular, two-way communication to keep this group satisfied.

Once key stakeholders have been identified, the next step is to determine how the team implementing the initiative will communicate with them and define stakeholder engagement objectives. Once stakeholders have been identified and the objectives of their involvement in the university's improvement activities has been determined, a Stakeholder Engagement Plan should be developed. It may include:

- identification of tools that will be used to implement the stakeholder management strategy,
- identification of methods of communication,
- determination of frequency of engagement,
- identification of audiences for each engagement.

Planning Risk Management

A risk is any uncertain event or condition that might affect the project. The main purpose of the risk planning process is to identify potential problems that may arise during the implementation of an initiative or process, analyze how likely they are to occur, and take action to prevent or minimize the risk. When risks materialize during tasks implementation it is often too late to react. Therefore, it is important to plan for risks during the planning phase and to go back to planning throughout the project. A risk management plan is a document aimed to foresee risks, estimate impacts, and define responses to risks.

The risk planning process involves using checklists of potential risks and assessing the likelihood of those events occurring on the project. In the risk identification process, the team can use its experience, the organization's experience, or the experience of industry experts who can be valuable resources for identifying potential risks in the project. Examples of categories that could be sources of potential risks: cost, schedule, stakeholders, technical issues, environmental issues etc. The team analyzing the risks associated with the improvement initiative being implemented can prepare a simple analysis using the following table: The sample *risk register record* is presented in frame of the description of Risk Analysis and Management technique.

Planning Monitoring and Improvement

An essential step in the change planning process is monitoring and evaluation. The organization should be able to assess to what extent the implemented changes affect the achievement of the set of strategic goals. The overarching goal of the monitoring and improvement process is to refine the educational offer and how the educational process is delivered in terms of employability of students and university graduates using *Occupation Personas* and *Job Positions Canvases.* Before finalizing the plan, it is important to agree on what information management needs to receive in order to assess progress. *The Performance Assessment Plan* should include items such as:

- explanation of the assessment methods used and identification of data sources,

- linking the evaluation methods to the university's established objectives,
- indication of the persons responsible for the particular evaluation elements,
- a timeline of the various stages of assessment (semester/academic year/learning cycle/graduate outcomes perspective).

Input

- University (Enterprise) Architecture.
- Stakeholders' availability and communication preferences.
- University education needs.

Output

- List of Areas of Analysis for Canvanizing
- Team and Stakeholders Engagement Approach
- Communication Plan
- Risk Mitigation Plan
- Performance Assessment Plan

Techniques

- Risk Analysis and Management
- RACI
- Backlog Management
- Acceptance and Evaluation Criteria

Stakeholders

- Career Offices Staff Members,
- University Management Staff Members (Deans, Vice-Deans)
- University Teaching Staff Members

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Job Market Analysis

Aligning

- University Educational Strategy
- Educational Offer
- Development of Job Positions List for selected Areas

►

- Communication with Career Offices
- Communication with Uni Management Staff
- Communication with Employers

►

On-line Research

►

Job Positions Requirements Modeling & Analysis

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Job Market Analysis

Scope

In order to make any improvements with regard to educational offer, the reference model should be developed. This can be done by careful analysis of job market requirements with regard to university educational strategy. This is of course collaborative effort involving such entities as University Management Staff, University Education Staff as well as Career Offices Staff Members. Such cooperation will provide detailed view on how current job market requirements look like, what are main trends and tendencies. This knowledge area describes the tasks that are performed to prepare for and conduct elicitation activities and confirm the results obtained with regard to the labor market. It also describes the communication with stakeholders once the information is assembled and the ongoing collaboration with stakeholders throughout the analysis activities. The tasks results obtained will be used as an input during gap analysis.

This knowledge area includes the following tasks:

- Aligning University Educational Strategy with Educational Offer & Development of Job Positions List for selected Areas
- Communication with Career Offices
- Communication with Uni Management Staff (Deans, Vice-deans)
- Communication with Employers
- On-line research
- Job Positions Requirements Modeling & Analysis

Tasks

Aligning University Educational Strategy with Educational Offer & Development of Job Positions List for selected Areas

The ***education strategy*** should take into consideration several areas. Most of the universities base education strategy on the following pillars: *inclusion*, *innovation*, *assessment*, *employability*, *academic support*.

Inclusion is related to enhancing international character of the university (e.g. increasing number of international students), build university community and support integration into it, provide additional services to students from under-represented backgrounds that will enable them to achieve their full potential.

Innovation aspect connects learning programs that are challenging and job market relevant (also internationally relevant) with research conducted by the university staff members. This should be done in the ways that enable to meet best academic standards. Innovation related activities are also responsible for providing students with the culture which is research driven and drives excitement related to learning, discovery, fresh ideas and out-of-the-box thinking.

The aim of innovation area is also to *encourage students to become partners in their own learning*. It seems that what can support this goal is to create an environment in which the students can take the responsibility for their own learning and if this will be done they will become self-sufficient, independent learners in their disciplines.

Assessment area concerns the forming the cyclical relationship between learning, assessment and feedback. This can improve students' understanding of their learning experience, progress made and learning direction taken.

Employability is the area that should provide students with opportunities for professional end community engagement in different contexts such as internships, volunteering activities, job fairs, meetings with professionals. Students' employability can also be enhanced by reducing the gap between graduate profiles and real job market requirements. It can be done by monitoring job market requirements, selecting the most relevant and aligning properly educational offer with regard to learning outcomes (knowledge, skills etc.). Of course this is never ending process and these activities have to be done in the systematic and disciplined manner.

Academic support should facilitate students' transition to study at the university and progress through their academic programs. This is usually done by specific organizational units of the university (e.g. *Career Offices*, *International students Offices*) as well as carefully planned and implemented *mentoring/tutoring programs*.

All these areas will depend on the university specificity, its vision/ goals and educational market strategy that is related to the question *"What majors we should take care of the most because of country/region/city economic situation, employers requests/expectations?"* If the university will plan the educational offer based on these questions then it will transform into students' employability boost and market attractiveness of the university offer.

The contents of this document (*JPCBoK*) is related mainly to support educational strategy of university in such areas as *innovation*, *employability* of education strategy. It can also be used in *Academic support* area.

University strategy is a wider concept than education strategy, however both are strongly connected. This means that university strategy takes into consideration competitive advantage the university tries to build on educational offer which is of course only one of the relevant dimensions. Therefore before the canvanizing process will start, university authorities should decide on the most important majors for which possible job positions will be selected. Setting the priorities for majors is important for two reasons. The higher priority the stronger relationship of selected majors with university strategy. The second one regards the resources that will be consumed by canvanizing process as it requires staff members that will get the jobs done. Without priorities the resources may be consumed and no impact will be made on university competitive advantage. Therefore the task should be done by the team consisted of university decision makers (management staff members), teaching staff members, career office workers and SMEs. After most important majors are carefully selected then possible job position related to majors' graduates profiles are identified. The ***output*** of this task is a ***list of majors with related job positions***.

Communication with Career Offices

Career Offices has an important part to play in process of transformation from education to employment as well as in improving matching and anticipation of study programs to labor market requirements. Communication with Career Offices includes the processes required to identify current demand for skills to provide the study programs relevant today and tomorrow.

Establishing cooperation with Career Offices is a three-step process:

(a) initiate cooperation – communication plan development
- identifying of stakeholder' needs regarding to the cooperation; identifying of information required: content, format and level of detail; setting the timeframe and the frequency for the distribution of information, agreeing the participants in the communication process and their responsibilities, development of methods and tools for updating information etc.

(b) maintaining a formal and informal relationship;

(c) regular assessment of established cooperation.

To create the relevant job positions canvases, the best understanding of the local labor market situation is required. Relevant demand-side data can be gained from:

- the inflow of job vacancies by employers,
- student and graduate employment rates by fields of study,
- internships and vocational programs completed by students by occupation, field of study and qualifications in the labor market,
- reports with assessment of students' qualifications after completed internships and vocational programs,
- frequency of submitting job offers by specific sectors of the economy,
- job offers by occupation/field of study submitted on different employment recruitment events (such a job fairs),
- unsuccessful recruitment processes,
- internal analysis of job advertisements done by career counselors,
- internal analysis of the local business landscape.

Communication with Uni Management Staff (Deans, Vice-deans)

The role of the university management staff is important, as they are responsible for coordinating the development and implementing a study programs and curriculums relevant to labor requirements. Job positions are emerging, evolving and disappearing and employers are expecting graduating students to be ready to meet the existing as well as the future skill demand. Deans as well as Vice-deans are an essential part of the long-term strategic schemes due to the fact that now, they are required to lay emphasis on study programs that assure student success after graduation (which means student's future employment). University management staff must ensure that students will finish the study with the right skills that are in demand in the job market. To provide students with relevant skills, study programs and curriculums must include these kind of required skills articulated in frame of learning outcomes. In the process of planning study programs, the Dean relies on reliable, current market data as well as his/her knowledge of the field of study for which he/she is responsible.

The information obtained from the dean includes:

- relevant job positions assigned to analyzing field of study (faculty) for which job position canvas is developing,
- a list of sectors connected with the faculties and their importance from university as well as job market point of view,
- qualifications that are developing in frame of study program and curriculums that will prepare the student for further employment,
- trends (which sectors are growing or declining).

Communication with Employers

Consultations with employers are crucial in the preparation of educational offer adapted to the requirements of the labour market. Consultation can take place in two modes: informal and formal. University employees: deans and vice-deans as well as Career Office staff establish informal contacts mainly with local employers in order to develop educational results and express opinions on the desired profile of a graduate. During the organized meetings/workshops, the employers express their opinions on the learning outcomes and study plans for particular majors. Informal talks with employers are also held at the level of individual academic teachers, who at a later stage, while preparing the syllabus, have partial freedom in the content and techniques and methods of course realization.

Formal consultation can take place through the establishment of an official body consisting of:

- professional and business associations,
- organizations of employers
- entrepreneurs of significant importance to the regional and national economy.

The appointed body expresses opinions on the prepared study plans with particular emphasis on the level of adjustment of the learning outcomes to the needs of the labor market.

An additional source of knowledge are reports prepared by Career Offices containing an analysis of provided documents related to the internship, i.e. the internship placement sheet and employer surveys, which indicate the strengths and weaknesses of interns (soft competencies and the level of professional proficiency).

On-line research

A systematic review of online sources allows the college to stay informed about changes in the labor market. Primary online sources of information include:

- Advertisements published in local newspapers (demand for labor in the local market) and national portals with advertisements. The advertisements provide information on the number of vacancies in each industry, pay levels, leading employers, how workers are recruited and their characteristics.
- Academic articles and industry reports on employment, including official documents from the European Commission and national authorities.
- Websites of the largest employers in the industries for which the university organizes education.
- Websites of local labour offices, especially from the geographical area where the university operates.
- Reports on the economic fate of graduates, prepared on the basis of data provided by insurance institutions.

- Social networking sites (LinkedIn, Facebook, industry forums) where you can find records of discussions by both employees and employers about particular job positions.
- Data presented by the statistical office on the level of unemployment in particular regions, taking into account the occupation, and gender. Additionally, reports on the level of salaries in particular sectors.

The information from these sources gives the opportunity to identify the most important characteristics of graduates, to determine knowledge areas, professional skills and social competencies. In addition, conclusions can be drawn about the labour market demand for trained professionals and "emerging" professions.

Job Positions Requirements Modeling & Analysis

After information about the job market is collected (task *Job Positions Requirements elicitation*)· the modeling and analysis can start. In order to better understand the job market requirements they can be modeled. There are two useful techniques that can be used: *Occupation Persona* and *Job Position Business Model Canvas*. Both are adapted based on well-known techniques – *Business Model Canvas* and *Persona*.

Every occupation persona represents the whole segment of people who can be hired for specific job position because they meet requirements. Creating the occupation personas is the process very similar to standard activities done when preparing a typical persona. Based on the information collected with regard to specific occupation the persona will be created and include the following sections and corresponding items:

General info

- *Name*
- *Picture*
- *Demographic characteristics (age, gender, marital status, location, wages)*
- *Short bio*

Personal resources needed

- *Knowledge areas important for specific job position*
- *Skills required*
- *Abilities possessed*
- *Character traits*
- *Mobility level*

Key activities

- *Jobs to be done*

These items can be extended according to specific needs during occupation personas development process.

Important issue is to present information in a compact, easy to analyze and understand, clear form. There are several on-line tools that enable to prepare one-page specification for personas (www.xtensio.com, www.uxpressia.com, www.miro.com). In case the on-line tools are used several benefits can be gotten such as sharing personas among stakeholders, teamwork when preparing personas, easy flow of comments & feedback.

Having occupation personas developed it is easier to show the wider context of specific job position, because some of the elements are already in place (*Key Resources*, *Key Activities*). Big picture showing the full business context of a job position can be developed with *Job Position Business Model Canvas*. As it was already mentioned this is *Business Model Canvas* used to describe specific occupation.

The canvanizing process is not very complicated but requires a good understanding of specific job position organizational context and the *Business Model Canvas* technique (*basic building blocks, what they should include, how they are connected etc.; see Techniques section*). However all important information has been collected as a part of *Job Positions Requirements elicitation* task in cooperation with University Management Staff, Career Offices (*contact with Employers, SMEs*) as well as through on-line research. This information can be used for development of *Job Position Business Model Canvas*. Sample Job Position Business Model canvas is presented on the figure 4. below.

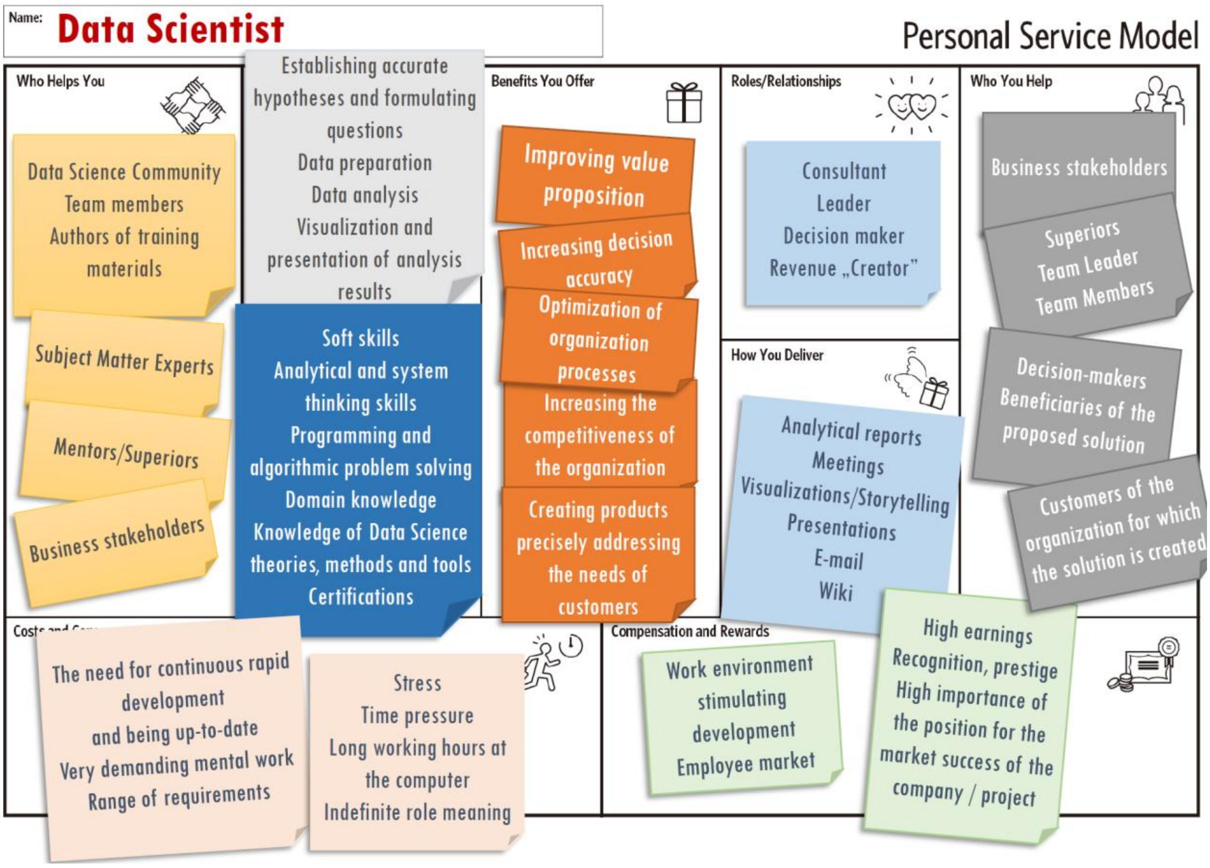

Figure 4. Job position business model canvas for Data Scientist occupation

Input

- University educational strategy
- List of Areas of Analysis for Canvanizing
- On-line Research plan
- Team and Stakeholders Engagement Approach
- Communication Plan
- Risk Mitigation Plan
- Performance Assessment Plan

Output

- Job Positions List
- Occupation Personas
- Job Positions Canvas Library

Techniques

- Documentation Analysis
- Education Requirements Workshop
- Interviews
- On-line Research Techniques
- Focus Groups

Stakeholders

- Career Offices Staff Members,
- University Management Staff Members (Deans, Vice-Deans)
- University Teaching Staff Members
- Employers
- Job market analyses providers

Educational Requirements: Elicitation & Analysis

Analysis of Current State of Uni Documentation: graduate profiles, study programs, syllabuses

Analysis of Formal Educational Requirements & Preparing the Core Content of Educational Requirements

Other Uni Educational Offers Benchmarking

Learning outcomes analysis
AS-IS

Modeling of graduate profiles
AS-IS

Developing the list of items for Gap Analysis
(Learning outcomes)

Educational Requirements Elicitation & Analysis

Scope

Based on reference model developed for current labor market situation educational requirements related to learning outcomes should be elicited and analyzed. This requires to undertake many analytical tasks such as analysis of current state of university documentation (graduate profiles, study programs, syllabuses), analysis of formal educational requirements and benchmarking of other universities educational offerings. Then learning outcomes in their current form and state (AS-IS) are analyzed. Analysis can be supported by modeling of graduate profiles. Finally graduate profiles are mapped into job positions and a list of items for gap analysis is developed.

This knowledge area includes the following tasks:

- Analysis of Current State of Uni Documentation – graduate profiles, study programs, syllabuses
- Analysis of Formal Educational Requirements & Preparing the Core Content of Educational Requirements
- Other Uni Educational Offers Benchmarking
- Learning outcomes analysis – AS-IS
- Modeling of graduate profiles - AS-IS
- Mapping Graduates Profiles into Job Positions
- Developing the list of items for Gap Analysis (Learning outcomes)

Tasks

Analysis of Current State of Uni Documentation – graduate profiles, study programs, syllabuses

Each university has formal documents that allow it to provide education in its field of study. These documents serve various groups of stakeholders and are necessary in the process of accreditation by governmental institutions. Such documents as the graduate profile, syllabuses with the recorded educational results, the matrix of educational results and curricula should be synchronized with each other. Achieving consistency in university documentation is a very difficult task for many reasons. The most important problems include the vague notion of educational results (especially in relation to various disciplines), the difficulty in simultaneously taking into account the perspective of students, academic teachers, managers, employers and the multiplicity of persons involved in creating the documentation. However, formal documentation is a good starting point for finding gaps in the teaching offer.

Formal documentation should include at least such documents as:

- set of learning outcomes and study plans reviewed by external stakeholders,
- the matrix of learning outcomes for the field of study,
- the graduates' profile prepared based on labour market research,
- syllabuses approved by the Department Head and the Dean,
- resolutions concerning the educational results and study programs,

- reports of university quality teams.

Analyzing the documents mentioned above, one should pay attention to:

- the precision of the formulations (are they clear for all groups of stakeholders),
- the sources of data used to prepare them,
- the rationale for the succession of subjects,
- consistency with the vision of the institution's development,
- balance between academic content and that indicated by employers.

Identified inaccuracies will be a stimulus to improve the educational offer. Clarifying inaccuracies should be a team effort among all key stakeholders.

Analysis of Formal Educational Requirements & Preparing the Core Content of Educational Requirements

The introduction of the European Higher Education Area resulted in the unification of requirements for graduates in different European countries. The planning of a new course of study is based on the pan-European characteristics of the learning outcomes for qualifications at different levels of higher education which are formally published by the ministries of higher education. The first variant of the curriculum and the learning outcomes matrix for the major are developed by a working team led by the Dean. Implementation of the above task requires analysis of the following sources:

- mission and strategy of the University,
- faculty strategies,
- legal acts,
- reports containing analyses of labor market needs.

Other Uni Educational Offers Benchmarking

No university, while preparing an educational offer, acts alone on the educational market. One of the key tasks is to conduct a comparison with the offer of other institutions. When analyzing the offer of competitors, the following questions should be answered:

- what is the educational offer on the local market and on the national level of public and private universities,
- what is the offer of the best universities from the area of European Higher Education,
- what is the offer of countries outside Europe (USA, China, Australia),
- - What is the preparation of a graduate profile and study programs at leading universities,
- - what are the teaching delivery methods.

When analyzing educational offers, attention should be paid to the representation of both universities and polytechnics (usually more strongly related to the needs of the labor market). In the contemporary educational landscape, non-university education also plays an important role, e.g. certification programs offered by MOOC platforms by large corporations. They should also be included in the analysis.

The result of the benchmarking- a set of good practices in creating an educational offer,

- a list of the most frequent learning outcomes and subjects.
- a set of good practices in creating an educational offer,
- a list of the most frequent e-learning outcomes and subjects.

The obtained data will be compared with the University's, and the most important differences should be analyzed among the key stakeholders.

Learning outcomes analysis – AS-IS

Each course offered by the university is accompanied by a syllabus (also called a course card). The most important elements of the syllabus are the learning outcomes and how the course is delivered, i.e:

- goals,
- the learning outcomes of the course, divided into knowledge, skills and social competences, with reference to the learning outcomes for the major,
- course contents,
- correlation between the learning outcomes, subject goals and educational contents.

Additional information about the learning outcomes is contained in the university's information system, in which the students' grades are stored. This usually makes it possible to determine which subjects cause problems for the students. Usually, however, such a system does not contain information on the degree to which particular learning outcomes have been achieved, which would be very valuable information. In the situation when the university data does not make it possible to determine the degree to which particular learning outcomes have been achieved, such information may be obtained directly from the academic teachers or from the reports of the educational quality teams.

As a result of the analysis of educational results, a list should be prepared:

- those learning outcomes that require further specification,
- learning outcomes (and educational contents) that are the most difficult to achieve,
- learning outcomes ascribed to 21st century competences (described in the language of the labour market).

Modeling of graduate profiles - AS-IS

Modeling *Graduates' Profiles* can also be done with the use of Persona technique. AS-IS modeling means that in personas one should take into consideration the current state of skills and knowledge areas developed during classes planned for specific major. Every graduate persona describes the whole group of students who have gone through all the planned classes for the major, received credits and finally graduated.

Based on the information collected with regard to learning outcomes the persona will include the following sections and corresponding items:

General info

- *Name*
- *Picture*
- *Demographic characteristics (age, gender, marital status, location, wages)*
- *Short bio*

Personal resources developed

- *Knowledge areas*
- *Skills*

The main problem with Graduate Persona development is to create compact specification when there are so many items in *Knowledge areas* and *Skills* sections. Therefore more detailed elements should be grouped, merged and named accordingly. The best solution is to define *learning outcomes ontology* (*the same can be done for market requirements related to knowledge and skills*) that will hierarchically describe the graduate's knowledge and skills, from the most general to most detailed statements. In that case for persona specification will be selected the abstraction level of the description, that enables to keep persona clear and concise. Of course graduate persona can have attached more detailed description explaining the knowledge areas and skills sections.

Mapping Graduates Profiles into Job Positions

Every persona that describes *Graduate* knowledge & skills profile for specific major can have several job positions/occupations assigned. This will be done by the team consisted of University Management Staff (Deans or Vice-Deans), Teaching Staff Members, Career Office Workers (SMEs, Employers etc.). This step is very important because carefully done may increase level of graduates employability. Therefore in order to map Graduate Personas to proper *job positions*, the information collected in the tasks done in *Job Market Analysis* knowledge area should be taken into consideration. For every major the most important occupations should be selected and approved by University Management Staff Members. The importance is related to many aspects such as University Strategy and goals, job market attractiveness of occupations, specific geographical area. Occupations attractiveness assessment criteria should be developed with regard to specific university.

Developing the list of items for Gap Analysis (Learning outcomes)

The *Gap Analysis* is the technique used for identifying the lacking elements in skills and knowledge areas of graduates with regard to market requirements related to job positions graduate profiles are mapped into. The analysis is usually conducted with cross table where in rows and columns specific elements have been listed.

In order to develop this kind of structure for further analysis, the requirements should be listed on proper abstraction level for every occupation. The input for this task will be *Occupation Personas* and *Occupation Personal Business Models* developed in the task *Job Positions Requirements Modeling & Analysis*. Based on these models all important items may be identified and listed.

Occupations are related to *Graduate Personas*. This mapping has been done in the task *Mapping Graduates Personas into Job Positions*. Based on *Graduate Personas* which are done in the task *Modeling of graduate profiles - AS-IS*, it is possible to develop the list of learning outcomes every student has to meet to graduate from the University.

The output of this task includes two lists – the occupations' requirements (knowledge & skills) and graduate learning outcomes (knowledge & skills).

Input

- Job Positions List
- Occupation Personas
- Job Positions Canvas Library
- University Educational Documentation (current study programs, subjects syllabuses, graduate profiles etc.)
- University educational strategy
- Educational formal requirements (country/government specific)

Output

- Reference model for Formal Educational Requirements
- Graduates Profiles Personas (*AS-IS*)
- List of items for *Gap Analysis*

Techniques

- Benchmarking and Market Analysis
- Documentation Analysis
- Edu Requirements Workshop
- Interviews
- On-line Research Techniques
- Focus Groups
- Decision Analysis
- Acceptance and Evaluation Criteria
- Backlog Management

Stakeholders

- University Management Staff Members (Deans, Vice-Deans)
- University Teaching Staff Members
- Career Offices Staff Members

Omni-BEAST

Educational Offer: Assessment & Validation

Lessons Learned Analysis

Preparing the Assessment and Evaluation Criteria

Developing the Final content for Gap Analysis

Analysis of Gap Matrix: learning outcomes vs. job market requirements

Graduate Profiles Development TO-BE & Validation

Preparing the List of Planned Improvements & Setting the Priorities

Uni Educational Documentation Improvement (study programs, syllabuses, subjects cards)

Final Assessment of improvements by Uni Management Staff Members and getting the Final Acceptance

Financial Analysis of Planned Changes

Educational Offer Assessment & Validation

Scope

This knowledge area includes the tasks to be done to assess the value delivered by an educational offer of the university. It also provides the recommendations with regard to removal of barriers or constraints that prevent the full realization of the educational value proposition. The University Management staff makes decisions with regard to planned improvements and the changes that have to be made as well as the priorities that will be needed to plan the change. The financial analysis and feasibility study will also be conducted to finally accept the improvements plan.

This knowledge area includes the following tasks:

- Lessons Learned Analysis
- Preparing the Assessment and Evaluation Criteria
- Developing the Final content for Gap Analysis
- Analysis of Gap Matrix – learning outcomes vs. job market requirements
- Graduate Profiles Development – TO-BE & Validation
- Preparing the List of Planned Improvements & Setting the Priorities
- Uni Educational Documentation Improvement (study programs, syllabuses, subjects cards)
- Financial Analysis of Planned Changes
- Final Assessment of improvements by Uni Management Staff Members and getting the Final Acceptance

Tasks

Lessons Learned Analysis

Lessons learned is the knowledge gained from the process of educational offer preparation and implementation in previous periods (e.g. academic years). Lessons learned can be used for identifying required future improvements in educational offer. University can learn from its failures as well as successes thus this task should focuses on positives and negatives arising from the review of the current educational offer that are relevant to the future planning of educational programs.

The process of analyzing the lessons learned should include five steps:

- IDENTIFY positives (strengths) and negatives (gaps) arising from the process of reviewing of the educational offer done in previous periods and develop recommendations to improve educational offer
- DOCUMENT lessons learned that are captured. The conclusions should be reported to different stakeholders involved in the design and improvement of the educational offer
- ANALYZE and organize lessons learned for future application
- STORE lessons learned captured in a repository
- RETRIEVE all relevant lessons learned documents and uses them to identify possible improvements as well as risks

Preparing the Assessment and Evaluation Criteria

Because the assessment process is to contribute to the improvement of educational offer taking into account the requirements of the labor market, the process should be carefully prepared. The process of assessment preparation should starts with determining who will be the recipient of the information and who wants to learn from the results of the assessment as well as what are the fields of interest. Once it has been determined who are the primary stakeholders of the assessment and what areas should be evaluated, a set of criteria can be chosen.

The evaluation criteria used to review and evaluate educational offer should be defined. Evaluation criteria should be measurable. Through the evaluation criteria, the University is able to assess strengths and weaknesses of its educational offer and use that assessment in making improvements. The evaluation criteria must represent the key areas of importance. They can relate to the following sample areas:

- Strengths and weaknesses of an educational offer (study programs, syllabuses, methods of teaching etc.);
- Adequacy of the assessment of problems and opportunities related to the labor market
- Effectiveness of translating labor market requirements into educational offer;
- Appropriateness of different elements of educational offer (subjects, different activities etc.);
- Achievement of the outcomes of educational programs.

Developing the Final content for Gap Analysis

Before conducting the Gap Analysis the following essential steps must be taken to ensure that all proposed improvements will rely on adequate analysis of both labor market requirements as well as educational system requirements.

Step 1: Research prepared Job Positions List & Occupation Personas - *Job Market Perspective*;

Step 2: Research prepared Reference model for Formal Educational Requirements & Graduates Profiles Personas & Graduate Profiles Canvas - *Educational Requirements Perspective*;

Step 3: Prepare a check-list of most valuable lessons learned in the field of Educational Offer Assessment & Validation.

Step 4: Visualize captured data in a form of a relationship matrix that should record the gaps that exist between learning outcomes & job market requirements - *Edu Offer Gap Matrix*

Edu Offer Gap Matrix will be useful for Gap Analysis, and will allow comparison of the actual state (AS-IS) with what is expected from the labor market perspective (TO-BE).

Analysis of Gap Matrix – learning outcomes vs. job market requirements

Gap analysis helps to get to know what to trim, fix, expand, or change to get your university to the next level of its graduates attractiveness on the job market. Gap analysis leads through a detailed examination of where university is currently with regard to educational offer and where it should be so it is possible to start acting on facts, not assumptions, to reach full potential. Gap analysis can be done in the following steps:

1. Current state analysis
2. Identification of ideal future state
3. Finding a gap.
4. Evaluating solutions.
5. Creating and implementing the plan to bridge the gap.

This task is related to first 3 steps of *Gap Analysis*. The input to the task include two lists – the occupations' requirements (knowledge & skills) and graduate learning outcomes (knowledge & skills). The graduate learning outcomes represent the current state and occupation requirements refer to ideal future state. The gap analysis can be done with the use of following cross-table.

Occupation X		
	Job position req 1	Job position req 2
Learning outcome 1	X	
Learning outcome 2	X	
…		
Learning outcome N	X	X

The main question asked during analysis is *"Does the learning outcome cover job position requirement?"*. Determining to what extent learning outcome covers specific job position requirements needs deeper analysis of data collected with tasks done from such knowledge areas as *Job Market Analysis* and *Educational Offer Assessment & Validation*. If the gap was found then it has to be determined what is required to fully cover the requirement and how these can be transformed into learning outcomes related to ideal future state. The new learning outcomes identified will be the input to the task *Preparing the List of Planned Improvements & Setting the Priorities*. The gap analysis should be conducted for every occupation assigned to every graduate profile.

After all needed learning outcomes have been identified, the cross-table structure presented above can be used to validate and check if it is really possible to get to ideal state of educational offer, where the *ideal* means best fit between job market requirements and graduate profile(s).

Graduate Profiles Development – TO-BE & Validation

This task considers *putting it all together* with regard to skills and knowledge areas identified for job market requirements related to occupations. All learning outcomes have already been identified. They will include all requirements imposed by formal/legal regulations as well as learning outcomes connected with *most important occupations* assigned to graduate profiles. Having all the information in place with the best possible fit, *Graduate Profiles* in the TO-BE form that represent ideal situation should be developed. Recommended technique for this process is *Graduate Profile Persona* (see *Techniques section*) which can be used to finally describe knowledge areas and skills of the students graduated from the university on specific major. The *Graduate Profile Personas* will represent the ideal future state and will be used for solutions identification and evaluation as well as for creating and implementing the plan to bridge the gap between current educational situation and the desired one. After all *Graduate Profiles* have been developed final validation should be done as well as acceptance from University Management Staff.

Preparing the List of Planned Improvements & Setting the Priorities

Selecting the right improvements is a critical aspect of successful process of adjusting the educational offer to the market needs. The University should follow the steps below:

1) Identify and list the planned improvement initiatives
2) Prioritize by allocating priority points to each improvement initiative based on chosen criteria
3) Create a strategic plan to implement the improvement initiatives that are on the top of the prioritized list.

The key areas for improvement should be listed in form of The List of Planned Improvements which should be prepared with reference to the results obtained in frame of the Gap Analysis. It allows the identification of the gaps in skills and knowledge of graduates with regard to market requirements related to job positions graduate profiles.

The List of Planned Improvements may contain many ideas that should be implemented as part of the process of adjusting the educational offer to the needs of the labor market. Improvement initiatives should be prioritized according to criteria that are important for selected University. One of the most important criteria should be the degree to which the initiative will contribute to bringing the educational offer closer to the requirements of the labor market. Other parameterization criteria can be time, budget, scope, quality, risk as well as benefits. The team involved in defining and prioritizing improvement initiatives should be formally constituted. They should be responsible for identifying and prioritizing initiatives as well as managing the execution of the changes.

Uni Educational Documentation Improvement (study programs, syllabuses, subjects cards)

The documentation of the educational process should reflect the changes introduced and be up-to-date. Changes to both the curriculum, syllabuses and course cards must be discussed within the academic staff team and consulted with external stakeholders. This is an ongoing process repeated each year based on updated *Occupation Personas* and *Job Positions Canvas Library*. Changes must be made within the framework of current law, which means that for existing teaching offerings they must be phased in. In the case of preparing a new degree plan, more radical steps can be taken. Changes are usually made on a cycle determined by the academic year. The document that best reflects the introduced changes is the course card containing the most detailed description of the contents and methods of teaching. A situation where a course card is very general should be avoided. The student reading the course charter should be able to read the teaching philosophy and the connection of the content taught with the requirements of the labour market. The student should be able to answer the questions: Why should I study a given subject? What will the subject give me in terms of my development as a professional? The answer to these questions should be clear to the academic teacher, but not necessarily to the student. After reading the course card/syllabus, the student should feel that he/she should engage in the course because it is valuable, and not only to get a credit. Additionally, documentation of the educational process is not just for students. It is also important for:

- academics who will be teaching a particular subject in the future, but who were not necessarily involved in the development of the subject,

- career office staff, who will be able to use the information provided to link employers and students
- external stakeholders who will be able to evaluate the offered study programme.

Financial Analysis of Planned Changes

The university, like any institution, must take into account the financial aspect of operations. The costs of implementing changes must be carefully estimated and the university authorities will make the final decision which should be implemented in full and which in the long run. Universities are often under pressure from students and parents to reduce costs, but the financial factor should not be the only consideration. The mission of the university and the adopted development strategy are important. Using only ad hoc financial analysis can lead to blocking many changes. Different methods are used for financial analysis, depending on whether the costs of modification of the existing teaching offer are calculated or whether a new field of study is developed. In the first case, such elements are taken into account:

- General macroeconomic indicators including projected inflation.
- The amount of tuition fees at competitors (private universities) and the amount of government subsidies (public universities).
- Profitability of the conducted major in the following years (at least three years back) calculated based on:
  - Planned number of hours by class type,
  - Size of student groups,
  - Costs of personnel employment, taking into account ministerial guidelines concerning minimum personnel requirements (persons with particular academic degrees, number of business practitioners),
  - Costs of depreciation of specialized laboratories and software purchase.
  - Costs of trainings for teachers.
  - Indirect costs (service of the Dean's Office, Bursar's Office, IT departments, etc.).

When opening an entirely new major/new course, consideration is given to:

- -Comparison with a model major/course with comparable number of hours.
- -Costs of employment of academic teachers.

For financial analysis in the university used basic economic methods among others: ROI, Cost-Benefit Analysis, Cost-Effectiveness Analysis, Break-Even Analysis, Business Case.

Final Assessment of improvements by Uni Management Staff Members and getting the Final Acceptance

The prepared document describing the improvements together with the Financial plan is passed on to the Uni Management Staff Members (Rector, Director of Finance, Vice Rector for Teaching) who, guided by the strategy and development of the organization, make the decision. The approved improvement plan becomes a guideline for the prepared teaching offer. A very important aspect is proper communication between the management and the people preparing the improvement proposal and the financial plan. The decision-making process is usually prolonged due to:

- Time-consuming discussions among board members.
- Board determination of priorities for planned expenditures.

- Verification that the planned changes are consistent with the stated goals of the university.
- Provision of additional clarification by those preparing the various elements of the documents.

The decision made by the board should be announced and justified. Each person preparing the various elements of the document and the financial plan should feel that they have been treated fairly. Even in a situation where a formulated proposal has been rejected in part or in whole. The updated document with the decisions made by the board should be signed and passed on to the lower levels of the organization for implementation. An additional document is the Performance Assessment Plan, which includes information on how often the actions taken will be reported to the board.

Input

- Reference model for Formal Educational Requirements
- Graduates Profiles Personas (*AS-IS*)
- List of items for *Gap Analysis*

Output

- Edu Offer Gap Matrix and Gap Analysis results
- Graduate Profiles Personas
- Improvements List
- Financial plan

Techniques

- Gap Matrix Analysis
- Graduate Profile Personas
- Financial Analysis
- Decision Analysis
- Documentation Analysis
- Risk Analysis and Management
- Acceptance and Evaluation Criteria
- Backlog Management
- Lessons Learned

Stakeholders

- University Management Staff Members (Deans, Vice-Deans)
- University Teaching Staff Members
- Career Offices Staff Members

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Educational Requirements: Management & Communication

Preparing the repository for Job Market Requirements & University data ► Management of Up-to-Date Repository Contents (adding and ranking entries) ► Monitoring the fit between Job Market Requirements and Educational Offer ► Communicating Requests for Change to Teaching Staff Members ► Communicating and Justifying Edu Requirements to Students

Educational Requirements Management & Communication

Scope

This area targets managing and sharing the solution scope and the project requirements with the project stakeholders. This is where the team implements and refines the communication plan. On projects with a wide scope, stakeholder audiences can be quite broad and diverse. The tasks in this area constitute the vehicle to accumulate and share all or part of the project requirements with stakeholders. All the changes planned have to be effectively and efficiently communicated to all stakeholders. The communication should support building the university culture oriented on change, innovation and high education quality driven by employability of graduates.

This knowledge area includes the following tasks:

- Preparing the repository for Job Market Requirements & University data
- Management of Up-to-Date Repository Contents (adding and ranking entries)
- Monitoring the fit between Job Market Requirements and Educational Offer
- Communicating Requests for Change to Teaching Staff Members
- Communicating and Justifying Edu Requirements to Students

Tasks

Preparing the repository for Job Market Requirements & University data

Repository is a method of storing all needed information related to the tasks to be done, that encompasses those under development, in review, and approved. They are an efficient means of gathering, managing, and leveraging data across the university – including university documentation, stakeholders, solution and transition as well as quality requirements – along with supporting documentation, such as whiteboard sketches, word processing documents, and visual models.

The aim is to capture the important information in a repository that is accessible, meaningful, searchable, and sharable. The process should be supported by on-line tools (*Google Drive*, *One Drive, Dropbox etc.*) that enable to store data in electronic form, share the data and define the proper rights for all the stakeholders that will use the information. The selection of the repository management tool is up to the university specific requirements and after it's done information about how to access the data as well as the rights granted have to be provided to all stakeholders involved in the process.

It is worth to remember that repository is valuable if it's used. Therefore, the repository has to be part of the daily life of the university work environment. It has to function with the overall university enterprise architecture, and integrate with other technologies university uses.

Repository that will be used for storing information about canvanizing process should have clear structure every stakeholder involved in the process must know and understand. The structure can be organized based on two dimensions – documents types and/or stakeholders.

Structure oriented on documents types may include the following items:

- Job Positions Business Model Canvas
- Occupation Personas
- Graduate Profile Personas
- Job Market Requirements
    - Interviews with employers and SMEs
    - Education Requirements Workshops Results
    - On-line research results
    - Career Office resources
- Education related University Docs
    - Study plans
    - Syllabuses
    - Subjects Cards
    - Learning outcomes
    - Graduate profiles
    - Majors Description
- Other Stuff

Structure oriented on stakeholders types may be the following:

- Uni Management Staff
- Teachers
- Career Offices
- Other stakeholders

Presented structures may be changed according to specific university needs. However when it's done all the stakeholders have to share common understanding where to find specific data and where to put the data that has been created. In case the data is used as a foundation for the teamwork all the items stored in the repository should be versioned. It means that every time changes are made it should be clear who is an author of changes and what has been changed. It should also be possible to reverse to previous version when the new one has not been accepted by all stakeholders.

Management of Up-to-Date Repository Contents (adding and ranking entries)

The improvement of educational processes of the university and fitting the educational offer with real job market requirements is never ending effort. After the pilot project is finished and all acceptance criteria have been met the tasks should be repeated. The goal is to transform the project activities into the process activities. In that case the improvements can be done in a cycle according to needs that will periodically appear. The need for improvements may be triggered by significant changes on the job market or when the university introduces new majors, specializations or subjects. Therefore the repository content has to be kept up-to-date with regard to job market requirements. Every time the significant changes on the job market occur and are considered as being in the scope of university strategy the relevant information should be put into repository. The information can regard new and promising job positions related to graduates profiles, new skills the graduates are supposed to have well developed, new knowledge areas etc. It requires constant monitoring of job market environment done by university staff members playing different roles (Management Staff, Career Offices workers, Teachers etc.). Sometimes the update of the repository contents will be triggered by changes in university educational offer. If the university wants to stay competitive on the market it has to continuously improve its educational value proposition. It requires planning and implementing new, more attractive majors, new subjects as well as less formal educational initiatives such as building communities focused on specific topics, areas or professional domains etc. In that case before anything can be planned, the feasibility study has to be done and it requires up-to-date information about the job market requirements.

All new entries that will be added require prioritization. It is related to the scarce resources every university has under its disposal. Therefore the process of satisfying new job market requirements via educational offer improvements will be driven by university educational strategy and priorities set with regard to it. These priorities will be finally set by University Management Staff and accepted by decision makers responsible for university strategy.

Monitoring the fit between Job Market Requirements and Educational Offer

Finding the best fit between the university educational offer and job market requirements is the most important goal that is supported by this guide. However the fit state is not given forever. After university gets the fit and plan classes content with regard to it, sooner or later the situation on the job market will probably change. Therefore it is very important to constantly repeat the tasks from *Job Market Analysis*, *Educational Requirements Elicitation & Analysis* and *Educational Offer Assessment & Validation* knowledge areas. The main question that should be answered is about the *time frame university offer will stay frozen*. The shortest time frame is set by formal requirements imposed by educational institutions of specific country. It means for example that when cycle of studies has started, the structure of the study programs and lists of subjects cannot change. However after the cycle is finished then small amendments can be made with regard to current state of job market. The consecutive improvements may be introduced more easily as all the tasks have been done at least once and there are some *Lessons Learned* collected. In order to make the constant improvement process the habit of university staff members, it is crucial to build the university culture promoting education quality, trust and job market orientation of the skills and knowledge developed by students. It is also about developing students' awareness with regard to their passions, interests, characterological predispositions, and their correlation with possible education tracks they can select to be better prepared for future occupations they bear in mind or dream about. Monitoring the fit between Job Market Requirements and Educational Offer cannot succeed without well established and developed communication channels with job market. This can be done via close cooperation of the university with local businesses, entrepreneurs and SMEs in the area of collecting required competences and lacking elements in personal resources of university graduates. Very important role in this process should play Career Offices, University Management Staff Members (Deans, Vice-Deans) and Teaching Staff Members who cooperate (internships, professional services) with business/entrepreneurial/industrial environments. Effective and efficient communication enables to sustain the constant fit between job market requirements and university educational offer.

Communicating Requests for Change to Teaching Staff Members

Without the active participation of teaching staff, long-term change is impossible. Academic teachers unconvinced about the new way of teaching will put up passive resistance. The process of informing cannot be limited only to the publication of official documents, e.g. university policies. At the beginning the new approach should be convincingly presented by the university authorities at a high level of generality. *Why the changes are being introduced, what are the benefits from the point of view of the university, academics, career offices, employers and, above all, students. Why should academic staff be actively involved in the process?* Having a holistic vision will better communicate with students and employers. Persuasive communication of the vision will allow staff to change their mindsets and not feel that the changes being made are just another bureaucratic invention that hinders teaching.

Detailed steps should then be taken, including:

- Select leaders of change, individuals who are convinced of the validity of the changes being made and who are willing to commit their time to preparing better aligned learning materials. These individuals should be adequately rewarded for their efforts.
- Organize a practical, full-day workshop during which *Occupation Personas* and *Job Positions Canvas Library* will be presented and the process of modifying content and teaching techniques will be demonstrated on the example of one of the subjects.
- Prepare a repository of documents on the implementation of changes and offer interactive e-learning courses and webinars with practical examples (courses should be available on a continuous basis). Additionally, a change leader should be available at designated times to answer ongoing questions from academic staff.

In order to encourage teachers to take an active part in the changes, the university should consider the involvement during periodic employee evaluations. Of course, at the beginning, incorporating changes will generate more work, but ultimately it will make teaching easier and more efficient. The point is to change the way of thinking about teaching. Teachers themselves have a problem in many cases to show why a subject contains a particular content. Working on subject content will force teachers to think more deeply and think in terms of the labor market. By having *Occupation Personas* and *Job Positions Canvas Library* they will be able to convincingly explain the value of the subject to students. A solid understanding of the graduate profile will allow teachers to take greater responsibility for students' subsequent performance in the labor market. The potential changes observed in students and subsequent employability - should convince subsequent teachers.

Communicating and Justifying Edu Requirements to Students

The use of *Occupation Personas* and *Job Positions Canvas Library* may not be understood by students initially. The university should clearly communicate to students what the university's approach to building learning outcomes is. Communicating change should not be done solely through official documents (it cannot be assumed that they will be read). It is primarily the responsibility of academic teachers and deans to build an environment that engages students. Deans should convincingly present the profile of a graduate and information on employment opportunities resulting from the completion of studies. On the other hand, the academic teachers are responsible for showing the connections between the educational results, the content of credits and the requirements of the labour market. Learning particular subjects should be perceived as a means to gain employment in the profession, which results from the student's passion. The academic teacher should justify educational requirements throughout the semester, and not only during the presentation of the course card. Students should receive information concerning the achievement of particular educational results, and not only the final grade. In this way, they will have knowledge about their strengths and weaknesses in the labour market. At the university, there are also students who are more aware and do not think only in terms of the labour market, but their overall development. They too will benefit from clear communication of educational requirements. They will be able to select subjects flexibly according to their goals.

Techniques

- Backlog Management
- Surveys and Questionnaires
- Risk Analysis and Management
- Lessons Learned

Stakeholders

- University Management Staff Members (Deans, Vice-Deans)
- University Teaching Staff Members
- Career Offices Staff Members
- Students

Techniques

Techniques presented in this section constitute the *toolbox* supporting main stakeholders carrying out tasks included in knowledge areas of JPCBoK. The level of every technique's description granularity and scope is related to its importance in the process of educational offer improvement. Therefore some techniques well-known in other areas (e.g. Project Management, Business Analysis) like Brainstorming, Lessons Learned, Documentation analysis etc. have been described shortly as we have assumed that it is common knowledge. The techniques specific to our framework such as Personas, Personal Business Model Canvas (and their variations) have been described in more detailed manner as they have been adapted and adopted to new areas of applications important for our framework.

Brainstorming

Brainstorming is a group creativity process used to generate innovative and creative ideas to reach a solution and solve defined problem/problems. Brainstorming session should be running in a free-thinking environment with share of important rules:

- Avoiding judgement
- Encourage also crazy, unreal ideas
- Developing existing ideas
- Ideas should be in line with the main problem
- Using visual thinking
- Generating as many ideas as possible.

Before starting the brainstorming session the goals should be defined. Everything that is done in frame of brainstorming session should refer to set goals. The brainstorming session requires commitment of experienced facilitator - person managing the group and leading the process toward the goals.

Documentation Analysis

The purpose of the document analysis technique is to understand the present situation at the university related to the educational process. Phases of conducting an analysis of existing documentation:

- Preparation - Identifying documents to be analyzed (establishing criteria for including documents in the analysis, checking for validity).
- Review - analyzing the documentation and making notes. Making notes of questions, the answers to which must be collected using other techniques (e.g. interviews, educational requirements workshops).
- Summary - preparing conclusions, writing a structured report.

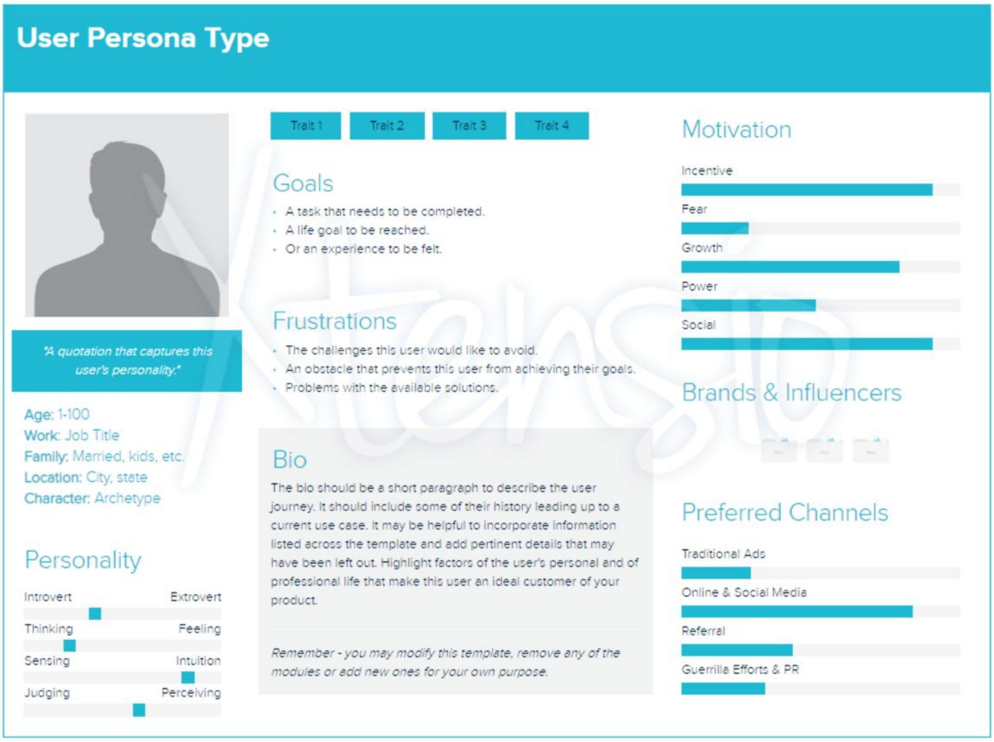
Documents that should be analyzed include:

- Documents concerning the educational offer (study plans, syllabuses, learning outcomes matrices, etc.).
- Documents concerning the university's policies and existing procedures for creating educational offerings.
- Documents concerning the university's mission and vision, organizational chart.
- Existing internal reports on: market research, quality of education, competitive offer.

Document analysis allows to detect inconsistencies with other sources. However, this technique can be time-consuming in case of gathering extensive documentation.

Personas – Occupation Persona & Graduate Persona

In typical applications of this technique, personas are fictional characters that represent the different customer or user types that act in a similar way when using product/service or have similar needs – problems to be solved or benefits to be gotten. Different criteria can be used for grouping customers/users into personas. The most common are demographics and behavior. Grouping is usually done after careful analysis and asking the questions related to specific dimension. In demographics-based grouping sample questions are: *Who are our customers/users?, What's their age and gender?, Where do they live?, How much do they earn?* When behavior-based grouping is used then the questions may be the following: *What our customers want?, Why are they doing particular things?, What motivates them?, What frustrates them?* The rule of thumb when defining personas is to interview several people per role. The tasks that these people perform define each of the roles. The tasks are done to achieve the goals persona has. Carrying out the tasks may be related to some frustrations customer/user has and wants to have reduced. This is typical way of thinking when specifying personas in traditional use cases.



There are not commonly established standards on how the persona specification has to look like, however there are different templates available that can be used. What is more, widely available on-line environments support the process of personas development (e.g. www.xtensio.com, www.uxpressia.com).

Typically when specifying persona the following elements are included and put onto Persona canvas:

- Name
- Picture
- Short Bio
- Demographic info

- Personality & Character Traits
- Frustrations/Pains
- Gains
- Jobs to be done
- Technology comfort level
- Typical scenarios related to product/service under development
- Motivation
- Preferred channels

The list is not exhaustive and depends on the domain the product/service is being developed for. Moreover the persona technique is quite flexible and may be adjusted to different applications as it has been done in this guide.

The persona technique has been adapted to describe specific *occupations* characteristics as well as *graduate profiles* in AS-IS and TO-BE variants. In both cased the grouping dimensions regards personal resources knowledge areas and skills

In case of graduate profile persona it should include the following items:

General info

- *Name*
- *Picture*
- *Demographic characteristics (age, gender, marital status, location,…)*
- *Short bio*

Personal resources developed

- *Knowledge areas*
- *Skills*

Graduate profile persona is used for analysis of current state of students preparation in terms of skills and knowledge areas developed. It is also used for preparing the ideal state, after job market analysis is done and new skills as well as knowledge areas have been identified based on job market research.

Occupation Persona should include the following elements:

General info

- *Name*
- *Picture*
- *Demographic characteristics (age, gender, marital status, location, wages)*
- *Short bio*

Personal resources needed

- *Knowledge areas important for specific job position*
- *Skills required*
- *Abilities possessed*
- *Character traits*
- *Mobility level*

Key activities

- *Jobs to be done*

Occupation persona is used to get a deep understanding of requirements related to skills and knowledge areas a prospect employee should possess and as an input for canvanizing process in which *Job Position Business Model Canvas* is developed. After is created and carefully analyzed, *Job Position Business Model Canvas,* may be the source of additional requirements. *Occupation persona* also provides valuable input for *Gap Analysis*.

Job Position/Occupation Canvas

Personal Business Model Canvas **(PBMC)** is a one-page technique first presented in the book *Business Model You: A One Page Method For Reinventing Your Career* written by Tim Clark, Alexander Osterwalder and Yves Pigneur. ***Job Position Business Model Canvas*** technique is based on *Personal Business Model Canvas* approach. The main assumption here is that every job position in an organization is related to a human resource needed to get the jobs done. By getting the jobs done, business creates value for its customers. An employee working on the specific job position can be considered as a human resource that has her/his own personal business model. It's structure and contents is presented on the figure 5.

Figure 5. *Personal Business Model Calvas*

Personal Business Model canvas includes nine key building blocks. Their contents are related to a specific job position. In this view, the *Customer Segments* (*Who you help*) component regards those who will pay to receive benefits or want to have the jobs done. They may be the stakeholders to which the staff member will report, internal customers (projects leaders, team members), or the organization's customers, business partners, and communities. This element together with the *Roles/Relationships* component enable us to understand the context of a staff member's interactions when working on a specific job position. The most important elements of the *Resources* (*Who you are*) component are interests, personality, abilities, and skills; it also includes knowledge, experience, and personal and professional contacts. Having identified all of these items for a specific job position, it becomes clear what are the real requirements for a prospective employee. Key activities (*What you do*) describe the most important tasks a professional must carry out when getting jobs done. A detailed description of this element can provide a view on the typical activities done in a job position. If the activities are done effectively and efficiently, then the staff member can produce a unique value proposition that transforms into a company value proposition. The benefits provided by a staff member on a specific job position are delivered via the proper *Channels* (*How you deliver*). Depending on workplace specificity, this can be done in many ways, such as submitting written reports, talking to people, uploading code to a development server, delivering oral presentations in person or online, and with vehicles (to physically deliver merchandise).

No job position is an island in an organization. Nowadays, the processes conducted in companies are organized around projects whose realizations are based on teamwork. Thus, it is good to know how a specific job position is related to the partners who can help. This is the responsibility of the *Key Partners* (*Who helps you*) module in Personal Business Model. Examples of key partners include all who support or help to do a job successfully by providing advice, motivation, opportunities for growth, or the specific resources needed. They may be colleagues, mentors from work, members of a professional network, professional advisers, or family members and friends.

The last (but not least) component describes the financial and non-financial sustainability of a job position with such areas as *Costs/Consequences* and *Compensation/Rewards*. When talking about cost structure, it is important to take everything a prospective employee will give into consideration – time, energy, and money. Hard costs should also be included, such as fees (training or subscription), expenses (commuting, travel, or socializing), vehicles, tools, or special clothing. Revenues (Compensation/Rewards) describe all income sources (e.g., salary, contractor, or professional fees, stock options, royalties, health insurance, retirement packages, tuition assistance) as well as soft benefits (e.g., increased satisfaction, recognition, social contribution, flexibility, prestige).

Gap Matrix Analysis

The Gap Analysis Matrix is a relationship matrix aimed to identify the gaps that exist in skills and knowledge of graduates with regard to market requirements. The matrix compares current state with ideal state and helps identify improvement opportunities. The matrix consists of columns and rows. Elements representing the current state (AS IS) are listed as columns, and elements representing the endpoint (SHOULD BE) are listed as rows.

Edu Requirements Workshop

The purpose of the edu requirements workshop is to enable the university to know and understand its stakeholders. As a result of the conducted workshops the university will gain knowledge allowing for the preparation of a valuable educational offer. The workshops also serve to present to the stakeholders the concepts, which should be taken into account while designing learning outcomes. The workshops should be planned for various groups of stakeholders, i.e. representatives of the external environment with particular emphasis on employers, the university authorities, employees of career offices, academic teachers, as well as students and graduates. The effect of the conducted workshops should be the establishment of a common understanding of what is the curriculum, learning outcomes, graduate profile and how to build an educational offer. The workshop should take place in small groups in an environment fostering creative work. During the workshop, according to the prepared scenario, techniques such as brainstorming, role-playing etc. are used. During the workshop it is recommended to use sample canvases (Job Position, Graduate Profile, Edu Value Proposition). After edu requirements workshop, the facilitator should prepare a document containing a synthesis of findings in a concise manner presenting the most important findings. The results of the workshop should be made available to the participants.

Interviews

An interview is used to gain a deeper understanding of the facts, opinions and attitudes of selected stakeholders. Interviews can be group or individual. Individual interviews should be conducted with carefully selected representatives of particular stakeholder groups (experts with extensive experience). The interviewer should have extensive experience in conducting this type of research, be able to choose the right time, place and overcome possible discomfort of the interviewee. A report should be prepared on the basis of the conducted interviews (with a possibility to review transcriptions of the interviews). The results of the interviews should serve as material for preparing sample canvases (Job Position, Graduate Profile, Edu Value Proposition). Depending on the purpose of the research, the interview may take the following form

- *Categorized interview* - conducted according to a strictly defined scenario.
- *A semi-categorized interview* - where there is a scenario, while the form and order of questions asked is free.
- *Uncategorised interview* - an interview in the form of a free conversation in accordance with the set research goal.

Decision Analysis

Decision analysis allows examining and modeling the consequences of various decisions made during the preparation of educational offerings. During decision analysis, the generated options are evaluated and a rational (optimal) solution is selected. Since the academic environment is less focused on profit maximization and more on universal values, decisions should be analyzed multifaceted. The most important decisions are made in the areas of:

- The educational profile and the vision of the university's development.
- Construction of study plans, determination of the content of individual subjects and selection of pedagogical strategies (what and how to teach).
- Policy of employing staff.
- Evaluation criteria.

The decisions made should be well justified. Effective decision analysis requires an understanding of many aspects of the decision to be able to structure the decision problem and the decision-making process. Decision making process may use among others: NPV, decision trees, rate of return, cost-benefit analysis, payback period, trade-off decision making methods e.g. goal prioritization, elimination of dominated alternatives.

Lessons Learned

Lessons Learned is knowledge (both explicit and tacit) that has been documented reflecting both positive and negative experiences. Lessons learned should be taken into account in future actions and behavior in the university to avoid mistakes or introduce good practices. Lessons learned require identification of applicable experience, documentation of experience, archiving experience, distribution within the university, identification of activities that should be taken as a result of the lesson learned, and follow-up to ensure that appropriate actions were taken.

Acquiring the lessons learned can be carried out in many ways - during meetings, workshop storms brains, interviews, in the form of surveys or reports. The conclusions from experiences should be write down in *Lessons Learned Register* that enables to apply existing knowledge as well as create new knowledge base.

Sample Lessons Learned Register Content:

ID	**Topic/Area**	**Lesson Learned that worked well**	**Lesson Learned that didn't work well**	**Entered by**	**Recommendations/comments**
1	Communication with employers		Process of consultation of changes made to the study program with employer X via e-mail took too long	Tina P.	Make sure that employer X received the material. More sufficient way of communication with employer X is face to face meeting

University should ensure that *Lessons Learned Register* is accessible to all involved in implementation of educational offer improvement initiatives.

Risk Analysis and Management

Risk Analysis and Management identifies areas of uncertainty that could affect the project/process of educational offer improvement. The activities undertaken involve identifying, analyzing, and evaluating risks. It is also important to develop plans for avoiding, reducing, or modifying the risks, and when necessary, implementing these plans. Continuous consultation and communication with stakeholders helps to both identify new risks and to monitor identified risks.

Risk identification is responsible for risks discovery and identification. It may be done through involvement of the stakeholders and by combining expert judgment, stakeholder input, experimentation, past experiences, and historical analysis of similar initiatives and situations. The goal is to identify a comprehensive set of relevant risks and to minimize the unknowns. Risk identification is an ongoing activity. When the project is conducted by the university for first time only expert judgement and key stakeholders input may be used as there are no past experiences and historical analysis cannot be done. When educational offer improvement activities will become the part of defined and managed process of the university then risk management may become easier to conduct.

Each risk item may be described in a *risk register* that supports the analysis of those risks and plans for addressing them. The sample *risk register record* is presented below.

ID	**Risk event**	**Consequence**	**Probability**	**Impact**	**Risk level**	**Risk modification plan**	**Risk Owner**
1	If SMEs are not available for job market requirements elicitation	then scope and quality of the job market analysis will be reduced,	Medium	High	High	Develop a plan for when the SME's are required, hold constant communication and obtain agreement about their participation	Career Office
…							
n							

Analysis of a risk involves understanding the risk with regard to specific event which is a source of the risk, consequence of the event that occurs and the likelihood the risk will materialize, which could be expressed on a numerical scale or with values such as Low, Medium, and High probability.

The consequences of a risk are described in terms of their impact on the potential value. The impact of any risk can be described in terms of cost, duration, project scope, solution quality, or any other factor agreed to by the stakeholders such as employability of graduates boost, more innovative and educational offer, better university support for students *etc.*

The risks are prioritized relative to each other according to their level. Risks which could occur in the near term may be given a higher priority than risks which are expected to occur later.

One or more approaches for dealing with a risk may be considered to address a risk:

- **Avoid**: the source of the risk is removed, or plans are adjusted to ensure that the risk will not occur.
- **Transfer**: the liability for dealing with the risk is moved to, or shared with, a third party.
- **Mitigate**: reduce the probability the risk will occur or the possible negative consequences if the risk does occur.
- **Accept**: decide not to do anything about the risk. If the risk does occur, a workaround will be developed at that time.
- **Increase**: decide to take on more risk to pursue an opportunity.

After the approach for dealing with a specific risk has been selected, a *risk response plan* is developed and assigned to a risk owner. All the stakeholders should be involved in the process of risk management which is an ongoing activity.

Survey and Questionnaires

Conducting surveys allows you to obtain information from many people in a short period of time (both anonymously and by name). A survey questionnaire can include both closed questions (convenient for further statistical analysis) and open questions (more difficult to interpret, but effective for obtaining insights and opinions). Questions can be submitted in writing (hard copy) or can be asked in person, by phone, or online.

Surveys should include:

- Students and alumni of the university,
- Academic teachers and administrative staff,
- Representatives of employers and labor market institutions.

Surveys are conducted in three stages:

1. *Preparation* - defining the purpose of the survey, the target group, preparing questions, determining the method of releasing the survey, the schedule and acceptable response rate, testing the survey.
2. *Release* of the survey with information for respondents on how the results will be used.
3. *Survey report* - analysis of responses and summary of results, quantitative and qualitative analysis. Possible separation of areas that should be additionally researched e.g. through interviews.

RACI MATRIX

A RACI matrix illustrates the connections between activities and the participation of various stakeholders and their roles. RACI is an acronym for the four most commonly used roles that stakeholders might play in any project.: Responsible, Accountable, Consulted, Informed.

- **Responsible (R):** Role of the person who is responsible for the task and the final outcome. Its responsibility is to make sure that the activities are undertaken.
- **Accountable (A):** Role of the person who is making the final decisions, responsible for the task in its entirety. Is the one to whom Responsible is accountable. One Accountable should be assigned to each task or deliverable.
- **Consulted (C):** Role of the person who has the knowledge and can take the time to provide with the information. Is the one who can verify that what is implemented is feasible and there are the necessary resources to do it.
- **Informed (I):** Role of the person who is kept up-to-date on progress, often these will be the person(s) whose processes may be affected by the change.

In order to prepare the RACI matrix, the first step is to identify all the tasks that need to be completed. Then, the roles (R, A, S, C, I) associated with each task should be assigned to each person (not all roles will be used for every task). In the last step, check that correctness of the matrix should be checked i.e. if each task has a performer and that each task is approved by only one person. The matrix should be approved before starting the work. The RACI matrix can be done with the use of the following cross-table.

Tasks	**Ann**	**Teacher 1**	**Career officer**	**Dean**	**Enterprise representative**
Task 1	Responsible	-	Consulted	Accountable	Consulted
Task 2	-	Responsible	Consulted	Accountable	-
Task 3	Accountable	-	Responsible	Informed	Consulted
…					

Financial Analysis

Financial analysis is the process of evaluating the project's profitability or cost-effectiveness (usually in relation to some alternative undertaking or investment). The results of the financial analysis can be used by University authorities to make a decision whether an initiative/project is worth investing. Financial analysis is one of the key tools needed by the managers of a university to examine the planned initiatives. Financial analysis involves using financial data to assess a performance and make recommendations.A financial analysis should focus on the following areas:

- Revenues - evaluation of quantity, quality and timing of revenues.
- Operational efficiency - the impact of initiative/project on operational efficiency as a result of using university resources.
- Capital efficiency - return on investment.
- Liquidity - the ability to generate enough cash to cover expenses.

The financial criteria will generally not be the only criteria used in deciding whether to implement an initiative/project at the University. Sample criteria to evaluate the project:

- Alignment with university strategy.
- Increasing stakeholder satisfaction (students, teachers, etc.).
- Reducing costs.
- Ensuring compliance with regulations.

Focus Groups

Focus Group Interviews (FGI - Focus Group Interview) is a discussion in a group of purposely selected people that is conducted by a moderator. The discussion must be focused around a specific topic or several topics. Focus groups are designed to determine stakeholder's feelings and perceptions about a proposed solution. Focus group sessions should take place in an atmosphere that allows for free expression of opinions. Unlike interviews, a focus group allows participants to interact while discussing and considering ideas. A typical focus meeting lasts one to two hours and is attended by 6 to 12 people. The meeting could be recorded, and at the end a report is created and made available to all participants.

Acceptance and Evaluation Criteria

Acceptance criteria are used to define the outcomes, or conditions that must be met in order for a solution to be considered acceptable to key stakeholders. Evaluation criteria are the measures used to assess a set of requirements in order to choose between multiple solutions. In the context of the university educational offer improvement project/process acceptance criteria may regard most of the tasks planned to be done. They may consider formal requirements imposed by regulatory bodies on learning outcomes, the job market research activities, the cooperation with external stakeholders (e.g. enterprises, SMEs) or project's deliverables. Whenever the task is planned, acceptance criteria enable to verify if the requirements for a task have been met. Acceptance criteria can be formulated by stakeholders of different types and finally verified and approved by University Management Staff.

Backlog Management

The *backlog* is used to record, track, and prioritize remaining work items. As this guide recommends an agile approach to the project, the *backlog* is one of the key artifacts used for planning and monitoring the project's activities. A backlog occurs when the volume of work items to be completed exceeds the capacity to complete them.

Backlog management refers to the planned approach to determine:

- what work items should be formally included in the backlog,
- how to describe the work items,
- how the work items should be tracked,

- how the work items should be periodically reviewed and prioritized in
- relation to all other items in the backlog,
- how the work items are eventually selected to be worked on, and
- how the work items are eventually removed from the backlog.

In a managed backlog, the items at the top have the highest business value and the highest priority. These are the next items to be selected to be worked on.

Backlog entries may be any kind of item which may have work associated with it. A backlog may contain, but is not limited to, any combination of the following items:

- Research to be done
- Interviews to be conducted
- Analytical tasks
- Personas to be developed (occupation, graduate profile)
- Occupation Business Model Canvas for specific job position
- Re-work related to university documentation (study plans, subject cards etc.)
- Mistakes made that have to be corrected
- Any properly named task that should be carried out

Items make their way to the top of the backlog based on their relative priority to other items in the backlog. When new or changed tasks are identified, they are added to the backlog and ordered relative to the other items already there. Whenever work capacity becomes available the backlog is reviewed and items are selected based on the available capacity, dependencies between items, current understanding of the size, and complexity. Items are removed from the backlog when they are completed, or if a decision has been made to not do any more work on them.

Benchmarking and Market Analysis

A higher education institution operates in a highly competitive market for educational services. The purpose of benchmarking is to compare the university's operations with the best practices of other private as well as public universities in both domestic and global markets. The research is focused on strategies, operations and processes. Benchmarking universities make comparisons, and comparisons to market rivals may include:

- The current teaching offer (learning outcomes, study plans, syllabuses).
- Processes of preparing the teaching offer adapted to the labour market demand.
- Cooperation of universities with employers.
- Communication with students, employees and employers.
- Development, strategic planning.

Carrying out benchmarking requires acquiring a partner - a university with which the comparison will be made. In the educational market, this is a very difficult task; benchmarking can be perceived as sharing the know-how of the university. Therefore, in case of difficulties in finding a partner, some data can be obtained on the basis of available online documents, existing reports and observations. The market research and benchmarking should be followed by the change implementation stage. Since the educational market is dynamic, benchmarking should be performed periodically. It is important to remember that benchmarking is a time-consuming and costly method.

On-line Research Techniques

Online research methods are ways of gathering information about a certain topic through Internet searches. The information gathered can include both factual information and expert opinions. Online research methods allow people to find information quickly. Some research methods are well-known methods but adapted to new technologies (such as interviews, focus groups, questionnaires, ethnography). With the development of the web, additional specific methods have emerged including: social network analysis (employer and employee profiles on professional portals), web experiments, online content analysis (websites, discussion forums, reports, online databases, regulations, etc.). Online research begins with the formulation of research questions and the selection of an appropriate method. During online research, sources of information should be recorded. Online research in many situations requires sophisticated data acquisition and automated data processing methods.

Perspectives

Perspectives are used within university educational offer improvement and students educational track development processes to provide focus to tasks specific to the context of the initiative.

The main perspectives are:

- Teaching Staff Members Perspective
- University Management Staff Perspective
- Career Office Worker Perspective

University Teaching Staff Members Perspective puts focus on:

- ***Better fit between contents of the classes and real market requirements.*** The *Occupation Business Model Canvas* developed for job positions for which specific classes are important enable to validate the contents and scope of the classes with specific knowledge areas and skills on the job market.

- ***Better understanding of students needs related to personal resources in the area of skills and knowledge***. By providing students with *Business Model Canvas* related to different possible occupations where classes content is a core and getting a feedback from students enable better selection of educational stuff and improved tutoring of students what will make them more and more aware of their professional identity. Based on skills and knowledge areas students report to have improved, it is possible to dynamically personalize the classes content according to group's specific needs connected with professional identities of group members, however this will require flexible template design for subjects.

- ***Better understanding of job market value of teaching stuff, classes contents.*** Having Business Model Canvas for job positions related to specific subject it is possible to determine the market value of teaching stuff and improve the classes forms and contents with regard students' personal resources development.

University Management Staff Members Perspective puts focus on::

- ***Educational Strategy Planning and Revision.*** Having clear view of job market requirements enables to better plan educational offer and constantly improve educational strategy.

- ***Graduates Employability Improvement.*** The fit between educational offer and job market requirements may significantly improve an employability of university graduates.

- ***Academic support.*** Deep understanding of how job market situation looks like with regard to most attractive occupations and required skills & knowledge should facilitate students' progress through their academic programs close.

Career Offices Workers Perspective puts focus on:

- ***Improved support in coaching and counselling students*** in such areas as: discovering professional identity, career development, job market requirements, selecting occupation that fits professional identity of students, graduate profiles analysis, design, re-design and development, finding options for additional trainings and courses.

- Visual thinking tools such as Business Model Canvas enable to clearly present to students the requirements set by the labor market in a persuasive and attractive way.
- Having a catalog of Business Model Canvas for various occupations, simplifies the process of finding the best fit between the students' personal resources and the available job offers.
- Business Model Canvas may be used as market requirements elicitation tool during the meetings with employers and support the process of collecting information about missing elements important from the employers' point of view. This can improve the correlation between educational offer and real job market requirements.
- Business Model Canvas can be applied with other standard tools used by Career Offices as a complementary technique.

References

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