

## **Pedagogy in digital learning in food education**

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### **Abstract**

This paper describes a study model that was used to create a more efficient way of learning to develop an entrepreneurial mindset of the students and graduates, in response to industry needs, and it involved use of web-based tools. Web based team and project learning, with the collaboration with food industry, is a motivating learning method for the present digital generation. The engagement of industry and their feedback on industry needs, pedagogical strategy framework developed with critical learning points and digital methods used helped to create entrepreneurial mindset of students, increased the motivation for students to learn to use new tools, and to learn faster and in a more economical way. Also those who were not willing to learn the use of new tools, were activated by other team members. The learning method was beneficial not only to students but also the future employers of the students, as it provided a window to develop and show the student talent to work in real life (industry) context. The team work of lecturers increases also the quality of supervision of the students.

Key words: Entrepreneurial graduates, Finland, industry needs, pedagogy, web-based learning

### **Résumé**

Cet article décrit un modèle d'étude qui a été utilisé pour créer un moyen plus efficace d'apprendre à développer un esprit d'entreprise des étudiants et des diplômés, en réponse aux besoins de l'industrie, et elle impliquait l'utilisation d'outils basés sur le Web. L'équipe basée sur le Web et l'apprentissage du projet, avec la collaboration avec l'industrie alimentaire, est une méthode d'apprentissage motivant pour la génération de l'ère d'internet présente. L'engagement de l'industrie et leurs commentaires sur les besoins de l'industrie, le cadre de la stratégie pédagogique développé avec des points d'apprentissage critiques, et des méthodes numériques utilisées ont contribué à créer un esprit d'entreprise des étudiants, a augmenté la motivation pour les étudiants d'apprendre à utiliser de nouveaux outils, et d'apprendre plus rapidement et d'une manière plus économique. En outre, ceux qui n'étaient pas disposés

à apprendre l'utilisation de nouveaux outils, ont été motivés par d'autres membres de l'équipe. La méthode d'apprentissage était bénéfique non seulement pour les étudiants mais aussi les futurs employeurs des étudiants, car il a fourni une opportunité pour développer et montrer les talents des étudiants à travailler dans le contexte de la vie réelle (industrie). Le travail d'équipe des enseignants augmente également la qualité de la supervision des étudiants.

Mots clés: diplômés entrepreneurs, la Finlande, les besoins de l'industrie, de la pédagogie, l'apprentissage basé sur le Web

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## Introduction

Web based learning methods have been developed in a wide range of fields in the last 15 years. The social media soft- and hardware development has challenged the pedagogical methods commonly used in education institutions. To find the best learning ways to improve good competences in food sciences for the coming food engineering generation, ICT tools are being used to improve learning. This is important because the diginative Y and Z generation have certain expectations for learning opportunities often independent of location and increasingly, networking and in cloud technology communities (Kullaslahti, 2012). The ebooks and mobile centers belong to the present world, followed with added and mixed reality, game based learning, which employ ICT based tools and learning analytics to recognize a risk learner (Kullaslahti, 2012). Team and project learning are effective applications for the use of some tools, mobile centers and digital hardware (Pirttijärvi and Kullaslahti, 2007; Pirttijärvi *et al.*, 2009).

The objective of this pilot project was to create a study model for more efficient way of learning, involving real working life experience, and to create an entrepreneurial mindset of the students and graduates, important for understanding the economic aspects of small and medium enterprise (sme) development. The distance education generations of cognitive-behaviorist, social constructivist and connectivist pedagogy (Anderson and Dron, 2011) was applied in the study as previously reported in food engineering studies (Helakorpi *et al.*, 2010) and industrial plant designing (Kautola, 2015).

## Methods

The food industry representatives were interviewed, one from each (n=12) companies, to receive the information of the present and near future needs in food process design (soft system methodology). The pedagogical strategy framework (Table 1) was used to find the critical learning points of the structure and to find the best digital methods to use in the present team learning method. The students studying in two different courses in different universities, could choose the social media and digital tools used like dropbox, facebook and mobile center. Only the learning platform was determined by the institute. The quantitative feedback from six study groups in three different years received by collecting by webropol questions and interviews, were analysed and involved clustering the students' opinions. The results were used for performance development. The course is being taught by three different teachers, a communications teacher, industrial economy teacher and the bioprocess teacher.

**Table 1. Pedagogic e-course's plan for the Industrial Food Process Design for the period 1997 - 2016**

The aim of the course	Contents	Learning, the student performance	Steering and feedback, the teachers performance	References of knowledge	The tools for eworking
Aims as competence	Description of the contents	How does the student learn this?	How and when the work is being supervised? (pedagogic, social, administrative and technical support)? Supervision through moodle or webex. Meetings e-conference or face-to-face. Seminars through webex (camera and mic).	Produced before or during the process? In advance will be given the frame of the task in parts according to the project schedule. Also the students study information and collect material for the task. Finally there will be a final report collected from information in the intermediate reports.	What net tools to use to support the work? First finding out what tools are available and suitable to use? Moodle and cad and other programmes, ebeam, webex (acp), skype, confluence-wiki, mobile center, free social media tools, webropol, etc.
Aim 1: Knows how to design a preparatory plan.	Content 1: Basic knowledge for designing the preparatory plan, working hour plan for follow up in schedule control	How does the student work? Team working and in smaller groups. Networking.	Who supervises and gives feedback? The teachers give oral feedback during the meetings.	Ready printed material or teacher written material? Both	The learning platform and its tools? Moodle, real-time net tools for communication, blogs, wikis, intranets; sms, e-mail, phones/mobiles, skype, mobile center

**Table 1. Contd.**

The aim of the course	Contents	Learning, the student performance	Steering and feedback, the teachers performance	References of knowledge	The tools for eworking
Aim 2: Knows how to read and draw process diagrammes and understands their differences.	Content 2: Drawing process diagrams, making lists and specifications and writing intructions.	What kind of learning assignments? Larger project work divided into smaller parts.	Planning the teachers' and tutors' time schedule and amount of work.	How to use different media elements: text, sound/voice, picture, grafics, animation, video, database? Plenty of database, pictures in diagramme production.	
Aim 3: How a larger project is performed in a team.	Content 3: Dividing work, taking in account expertise of others, reporting.	The students and the groups performance? Team work, team leader and secretary in each turn, learning meeting technology.  The plan of students' time schedule and amount of working hours? This plan will be made at the beginning of the course: Estimate and implementation table.	The teacher working hours according to face-to-face meeting sessions, theory lessons and practises.	How to use study sources? The project will be done in parts and will be presented as a seminar and a final report.	

## **Results**

The first year students found the work depressing (too much work), the second year team active, the third year group constructive and willing for continuing the method and development. Despite the new methods, some of the students still wanted to use the old traditional learning method. The students have still the possibility to choose the method used. The strong involvement in the projects by the industry motivates the students to do a better work. One result as such is the process itself. It appeared that the feedback from students and industry and regular communication, makes the students more ready to enter the real working life situation. During the implementation, the students receive a project subject from the company or find the subject themselves during their training period. They make a short marketing study to find the capacity to be used in their calculation. After studying the needed legislation, they draw diagrams and instructions to purchase needed material and equipment as well as write instructions to operate the production plant. Layout and costs and financing interest the organisations. The company representative lectures on real cases during the course. The learning is through exposure to technology, financial matters and bioprocesses. The motivation comes from the 'real life' subject. The workshops and seminars as well as exercise questions give the information for the final grades. Students can give feedback from the course either orally or written on paper or by a computer program. Teachers give feedback not only in terms of written grades but also orally during seminars. Further the company representative give oral feedback during seminars and during interaction with students and lecturers. The students' role is high during the course and the teachers are more at the background giving instructions when needed.

## **Conclusion**

The motivation of students was high and those not willing to learn new tools were also activated and supported by other team members. The competence learning was faster and more practical and business-oriented. The earlier used study systems and methods gave some influence on the feedback. The students, learning with the new model, were more ready to enter the real working life situation.

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