

Online project-based learning in the agri-food sector: a case study

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Abstract

This study investigates the differences between in-place and online project-based learning carried out over the years at the University of Macerata in the course of Economics and Marketing of Agri-food (an undergraduate degree in Cultural Heritage and Tourism). The study aimed to investigate the key elements to consider to implement online project-based learning with strong links with the place in rural settings. It reports about expectations from the teaching group about the learning experience implemented online for the first time, crossed with the outcomes of the students' evaluation questionnaires and discussed in a focus group among the teacher and the tutors. The conclusions highlight successful aspects and critical issues between the place-based and online-based experiences.

Keywords: *higher education course; experiential learning; education–industry relation*

Theoretical introduction

Project-based learning is widely recognised as an educational approach that provides meaningful learning and develops transversal skills such as communication, teamwork and problem-solving (Bell, 2010; Boud & Feletti, 1997). Introduced in medical education since 1969 (Barrows, 1996), it has been then used in several subject fields in higher education, such as engineering (Palmer & Hall, 2011), teacher training (Roessingh & Chambers, 2011), marketing (Henke, 1985) and in all levels of education (Helle et al., 2006; Kokotsaki et al., 2016).

Typically, project-based learning design entails five steps (Krajcik & Blumenfeld, 2006):

1. Definition of the driving question
2. Exploration by students of the driving question
3. Collaborative activities (with teachers, peers, community)
4. Scaffolding for and by students, integrated into the course
5. Creation of a tangible product

These steps are based on theoretical foundations relating to active construction, situated learning, social interactions and cognitive tools (Krajcik & Blumenfeld, 2006). Collaborative activities in project-based learning can be limited to classroom settings (Azmitia, 2013) or outside the classroom (Qualters, 2010). Outside the classroom, collaboration can happen as consulting field-study projects (Cook & Campbell, 2006). Consulting field-study projects usually entails a simulation of a business consultancy given by professionals to a company; in education, this is often carried out in teams and includes the following phases and steps (Cook & Belliveau, 2006):

- initiation, which includes client acquisition, student team formation and team organisation;
- client, which includes preliminary industry analysis, client issue and the initial meeting with the client;
- project, which includes the letter of engagement, project management and project communication and
- outcomes, which includes preparing the report, final presentation and evaluation.

With some adaptations, this typical scheme was used in several fields, among which are present management (Heriot et al., 2008), business (Annavarjula & Trifts, 2012), real estate (Calnan et al., 2019) and engineering (Maleki, 2009).

The approach also relates to the concept of co-creation of knowledge in a space where the [...] integration of knowledges and Discourses drawn from different spaces the construction of “third space” that merges the “first space” of peo-

ple's home, community, and peer networks with the "second space" of the Discourses they encounter in more formalised institutions such as work, school, or church' (Moje et al., 2014, p. 41). The learning experience in consulting field-study projects takes place at the crossroad of the environment, either physical or social (community), of the working sector in which the consultancy takes place, and the education context, which supports self-reflection, meaning-making and building of new knowledge, drawn from relations and dialogue. The process has high value for personal and professional growth: in particular, literature stresses the value of project-based learning for employability skills development (Hart, 2019; Kolmos et al., 2020).

Since the environment plays a vital role in the process, project-based learning in rural settings has peculiar features, which affect project-based education. First, besides agriculture, a field with an established framework, all sub-fields related to farm diversification are typically undefined; they range from agri-food processing and selling to agri-tourism, social agriculture and educational farms (Brunori et al., 2010; Evans, 1993). Therefore, students do not have a sectorial framework of reference. Second, farms and rural companies are composed, at least in Europe, mainly of micro- and small enterprises, often family businesses (Eurostat – Statistics Explained, 2018). Consequently, students need to consider low investment capacity in terms of finance, skills and time. Third, rural companies, not only those working in agri-food, have a closer relationship with the natural environment (Tanentzap et al., 2015; Wildlife and Countryside Link, 2019) and a strong identity linked to the place (Ray, 1998; Aleffi et al., 2020). Hence, students need to consider that innovative proposals should respect these two robust features of rural companies, particularly farms. Finally, rural and urban labour markets are very different in offer, recruitment and retention (De Hoyos & Green, 2011; Faggio & Silva, 2014; Paviotti, 2020): knowledge of the place makes the most of acquired employability skills.

Therefore, this case study explores the outcomes of an experience of field-study project-based learning pathway carried out online in the subject of agri-food to understand if any identifiable specificity related to the field should be taken into account in relation to the place.

1. Materials and methods

1.1 Research question

The research question was to understand which specific elements (if any) should be considered to design online project-based learning with companies and stakeholders in the agri-food subject field.

1.2 Research approach

The design of consultancy project-based projects belongs to active learning approaches. It challenges students to apply concepts, collect and analyse data and create new knowledge by deploying curricular knowledge (Harris et al., 2020; Heriot et al., 2008). It requires students to get involved and take agency of their learning, increasing awareness of their learning. Additionally, it supports understanding of the place and the working environment, acquisition of employability skills and career development strategies. Although this study was carried out in an emergency, the online choice was an opportunity to review established practices and open up possible evolutions. Also, in the rural settings and agri-food field, as in the rest of the world, digital transformation impacts personal and professional lives (Roberts et al., 2017; Hosseini et al., 2018). Furthermore, following the 'forced' digitalisation of the pandemic, the daily use of online technologies will probably increase in upcoming years, also in rural working fields.

The research design for this study refers to qualitative inquiry and triangulates sources of information (Patton, 1999, p. 1193) from the subjects involved in the process, as required by interpretive approaches. Techniques used are a survey (students), which included closed and open-ended questions, semi-structured and structured interviews (teachers/tutors and stakeholders) and focus group discussions (teachers/tutors).

1.3 Background context and sample

The study was carried out in the course 'Economics and Marketing of Agri-food' in the second semester of 2019–2020. The course is mandatory for the Bachelor Degree in Cultural Heritage and Tourism (national classification L1–L15): it enrolled 58 students, of which 54 participated in the project-based learning pathway (other 4 were part-time students and had access to a personalised learning programme). The course design usually includes a project-based learning path as a group activity; the appointed project for 2020 was a development plan for a company of agri-food and/or sustainable tourism, focusing on food and gastronomy as the topic of touristic tours. In face to face (F2F) courses, the theoretical basis is provided through introductory lectures. Students are introduced to, and instructions are provided on, the process (e.g. tools and deadlines). Companies present their cases in the classroom or during field visits. Students are required to choose one case and work in groups; the composition of the groups is free to stimulate self-organisation, and appointed tutors support them. Over about 6 weeks, students interview companies of the chosen case, find information on the market (competitors, marketing strategies, trends, etc.) and prepare their development project for the company. Assessment

requires the presentation of the project during a final event in which the addressed companies participate. Companies may ask questions and debate on the proposals.

In the academic year 2019–2020, the course was about to start when Italy declared a national lockdown following the emergency of the Covid-19 pandemic. The university went suddenly online, and the course required redesign. The redesign included: reformulation of the programme by eliminating field visits and any outdoor activity and requests for companies' availability for online work. Field visits were replaced with webinars and meetings with entrepreneurs over Microsoft Teams (the tool adopted by the university), and interviews were carried out online, through Teams or Skype, and by telephone, through a telephone call or WhatsApp. Students' working groups used the same channels, except for Teams, as they did not have direct access to separate rooms. Seven tutors supported the process, in which eight stakeholders participated (seven companies and one association working in agri-food). Assessment of the final products was carried out online, with the presentation of the projects to the concerned companies and the following debate on the proposed projects. Criteria for the assessment, which was performed by the teacher, the tutors and the stakeholders on a given online grid, were: completeness (of the proposal), feasibility and quality of the presentation (10 points each for a total of 30) – the mark weight for one-third of the final marks.

The projects delivered by students, based on the Business Model Canvas, included:

- a new clients' management strategy for a company producing artisanal pasta (1);
- a revised format and activities for the annual promotional event of cheese producers (2);
- marketing strategy and plan for social farms (2);
- communication strategy for the agri-food association (1) and
- new services for a company active in educational tourism (1).

All groups formulated their proposals by carrying out desk work and fieldwork. They collected market information online (partially suggested as references by the teachers, partially retrieved by students) and collected data from the companies and the associations through online interviews.

1.4 Data collection tools

Data were collected at the end of the course, after the closing of the exams session (June 2020), utilising an online questionnaire. The anonymous questionnaire included four dimensions, as follows:

- (1) overall learning experience (including technological user acceptance items);
- (2) quality of online materials;
- (3) quality of the project-based learning pathway and
- (4) added value of working (a) in a team and (b) with entrepreneurs.

This paper analyses data from dimensions (3) and (4). The set of items in dimension (3) has been adapted from Palmer & Hall (2011).

Each dimension required rating the items on a five-point Likert scale and included compulsory open questions, asking to comment on their rating by highlighting the strengths (what worked) and weaknesses (what can be improved). A final open question asked a reflection on the experience of working with stakeholders.

Out of 54 participants, 24 filled valid questionnaires.

Further, although focusing on different aims, the study collected data from the teacher and the tutors using short semi-structured interviews to understand the path's main successful and critical points from their observation point. Informal interviews with stakeholders allowed the collection of additional elements about three main dimensions: satisfaction, strengths and weaknesses of the process.

Data analysis was carried out and discussed with the professors and the tutors in a focus group organised online in July 2020 to define actions to improve the course's design and implementation. The focus group followed a typical structure (Krueger, 2012), namely:

- Topic introduction: presentation of the analysis of data collected from students
- Opening question: Are the results corresponding to those of the previous years?
- Key question: How can the course design be improved in its online version?
- Summary of results
- The focus group lasted about 30 min, including opening and conclusions.

2. Findings

Out of the 24 valid questionnaires, 20 were filled in by females (83.33%), 3 by males and 1 participant chose not to declare. The average age of participants was 21.92 years; the older was a mature student (56 years old), the youngest, was 21 years old. Of them, 21 had already previous experience in working in a group at the university.

Results from the questionnaire are presented below, grouped by topic.

2.1 Project-based learning evaluation

This set of nine items (tab. 1) aimed to understand the overall experience of the project-based learning exercise: items were formulated based on previous years. They focus on the most critical points usually reported and confirmed mainly by literature as difficult for some students, for example, group work or public speaking.

Table 1. Evaluation of the project-based learning experience.

Item	Average	St. dev.
Did you enjoy working in teams?	4.17	0.87
Did you enjoy giving oral presentations?	3.42	1.10
Did you understand what you needed to do for the design project assignment?	4.38	0.71
Were you able to find the information you needed to complete the design project?	4.38	1.01
Did your group work well together on all design project assignments?	4.33	0.92
Was your group presentation successful?	4.63	0.65
Were you satisfied with the design produced by your group?	4.50	0.78
Overall, were the project-based activities an enjoyable learning experience?	4.08	1.14
Did the project-based activities increase your knowledge of the field of economy and marketing of agri-food?	4.29	1.08

All the items reported high satisfaction with the learning experience: the higher standard deviations in items related to ‘oral presentation’, ‘enjoyable learning experience’, and ‘knowledge of the field of economy and marketing of agri-food’ were in line with expectations.

2.2 Acquisition of employability skills perception

The second set of eight items (tab. 2) included the most common employability skills; the question asked about the perception of improvement, thanks to participation in the course.

Table 2. Perception of acquisition/improvement of employability skills.

Item	Average	St. Dev.
Business skills	3.08	1.02
Communication	3.67	1.05
Critical thinking	3.58	1.10
Cultural awareness	3.63	1.13
Digital skills	2.96	1.04
Entrepreneurship skills	2.92	1.10
Problem-solving	3.46	1.22
Teamwork	4.13	1.15

Teamwork was, on average, considered the most improved skill by the participants, although with a considerable standard deviation, and this was in line with expectations. Instead, and to some extent, surprisingly, ‘digital skills’ were not among the most improved skills perceived by the students. This result was far from expectations for at least two reasons: first, digital skills are often mentioned as one of the most improved skills at the end of the F2F courses, since students are required to give a presentation to stakeholders (in public), and they often produce videos, animations and infographic in addition to a PPT file; second, the path was carried out entirely online and by using tools that students did not know before.

2.3 'What worked?'

This dimension was addressed through an open question. Keywords for each answer were identified (tab. 3); keywords were then clustered into thematic answers. Each answer could include more than one aspect.

Table 3. Strengths of the project-based learning experience.

Item	No.	%
Teamwork	9	37.50
Exchange (with stakeholders)	4	16.67
Research skills	2	8.33
Exchange (with tutors)	2	8.33
Autonomy	2	8.33
Knowledge of the place	2	8.33
Practice, practical work	1	4.17
Active participation	1	4.17
Exchange (with peers)	1	4.17
Negotiation	1	4.17
Leadership	1	4.17

Again, teamwork was the most appreciated characteristic of the learning exercise. Exchange (with stakeholders, tutors and peers) was also stressed as a successful outcome. Compared to expectations, this result was almost unexpected. According to the teacher and the tutors, teamwork usually appears with lower rates. It is often considered a weakness instead of strength; rather, 'knowledge of the place' is usually the first mentioned strength in such a process. This result can be explained by the fact that the 'place' was not a physical place, and the environment, 'rural', was reported, but not directly experienced with the body.

2.4 'What requires improvement?'

Respondents were free to express their remarks and suggestions by answering an open question. Unfortunately, many students did not answer this question by stating that 'all was good' or 'it was great' and similar comments. The analysis was carried out as for question 3.3 (tab. 4).

Table 4. Weaknesses of the project-based learning experience.

Item	No.	%
More guidance and instruction needed	4	16.67
Timing and deadlines	3	12.50
More instruction from the professor	2	8.33
More theoretical background	1	4.17
Increased contacts with stakeholders	1	4.17
Increased access to information (e.g. statistics)	1	4.17
Clearer evaluation criteria	1	4.17

According to the teacher and the tutors, most of the mentioned aspects are recurrent also in F2F courses. However, they are usually anticipated by providing more precise instructions, theoretical inputs or tailored guidance during the course. To some extent, as designed and managed, the online place could not reach the same level of attention as the physical place of the classroom, the corridors or any other informal setting that the players of the process share at the university premises.

2.5 Working with stakeholders

The question was again an open question, without guidance or suggestions on how to address the topic: ‘Why is it important, or it is not important, to work with local players (stakeholders) in this type of work (meaning the formulation of the project)?’ The analysis was carried out as in other open questions (Tab. 5).

Table 5. Perceived relevance of working with stakeholders.

Item	No.	%
‘Reality check’	11	45.83
Sharing, exchange, synergies with the place	6	25.00
Awareness of the labour market	4	16.67
Employability (skills acquisition and/or self-reflection)	2	8.33
Mentoring from experienced professionals	1	4.17
Opportunities for stakeholders’ (companies and associations) growth	1	4.17

In this case, respondents provided reasons (none negative) in line with expectations. According to the teacher and the tutors, the first reason was always the perceived ‘reality’ of the experience, followed by ‘links with the place’. Compared to the previous year, it emerged that the statement about the opportunity for stakeholders to grow, thanks to project-based learning with university students, defined as ‘an additional opportunity for stakeholders to reach their objectives’ [Respondent 19].

Stakeholders’ feedback focused on the satisfaction of participating in educational activities and perceived strengths and weaknesses. All participants agreed on the usefulness of the process and the pleasure to work with young people. The focus of the answers from companies was on corporate social responsibility towards the place and the future economic development of the rural area in which they work. The association reported instead that this type of work is consistent with their objectives of increasing the active participation of young people in the local economy.

Discussion and conclusions

This study aims at analysing the outcomes of a project-based learning experience in agri-food that was carried out online to identify distinctive elements between the offline and the online experiences. The study aims to determine how the online experience can be improved or strengthened to allow rural stakeholders to work with students in digital settings.

As a first result, it should be stressed that there were more similar than divergent results between the F2F and the online processes. Students’ feedback was about the same, at least in the following aspects:

- satisfaction on the project-based experience, overall;
- assessment of perceived acquisition of employability skills, although with some differences in digital skills, that were not ranked among the first ones, as it usually happens;
- the difficulties encountered to deliver the project were similar to those reported in F2F courses and
- the ‘real’ experience (working with real cases and dealing with actual companies) was the most appreciated and relevant process feature.

However, some differences between the online course and previous (offline) editions were clearly identified.

First, difficulties (perceived lack of guidance) were usually anticipated and solved early in regular courses. Concerning this point, the teaching team reflected that most of those issues are habitually addressed in informal contexts. Indeed, the department building is a campus outside the centre of the town, in which students and teachers often meet as also in everyday places (e.g. the cafeteria). The number of students also allows the teacher to have direct relations with them and know them personally by name. The ‘usual’ relation was somewhat altered online. Even if also available during unsocial hours or over the weekend, communication was not smooth as expected and difficulties were undetected to a greater extent. The redesign of the course in the following academic year should, therefore, consider a higher structuring of instructions and scaffolding provided and different forms of communication and group reflection (e.g. by organising a weekly ‘state-of-the-art’ meeting with the tutor).

Second, the ‘place’ was not equally embedded in the final projects or the students’ perceptions. A few did not consider the natural environment where the proposed development plan should take place. The opportunity to physically visit the company, as it happens in field visits, entails several added values, such as the following:

- In rural settings as the internal areas of the region, mobility takes time, as infrastructures (e.g. roads) are less developed than close to the town. To reach the place, therefore, also offers additional information, such as ‘How can I bring clients there?’
- Visiting the company is also a reality check; buildings, employees and social environment offer valuable information to the students in drafting their projects, which websites and online information cannot pass. The intellectual representation of ‘a company’ in undergraduate students often does not correspond to actual companies, but more to the stereotype of an enterprise – from the factory in which their parents work to a multinational corporation like Google.
- Regarding students’ perception, the low rating of the item ‘knowledge of the place’ was the higher difference retrieved. According to the teaching team, increasing knowledge of the place, intended as the interlocked shape of the human and environmental dialogue, is always the first perceived added value of the process. For students from the area, the process takes the form of reinterpreting the place with a different lens. For those coming from outside the area, field visits and dialogue with companies, stakeholders and the community mean increasing understanding of the area’s background, both for accomplishing the task and delivering the project and for personal development.

The second point seems less easy to tackle if the first critical point can have several tentative solutions to overcome the difficulty. The ‘place’, which is learnt and co-produced among the players within the environment, seems to lose most of the features of the ‘rural’ in the online process. There is most probably a physical component, the body experience, which is remarkably diversified in rural contexts in terms of physical inputs (smells, sounds, colours, people, etc.), and it is not exploited online. At present, the teaching team reflects on the potential of multimedia, such as videos (also produced by the students), simulation games and others. However, companies do not always have time to support this production process or are equipped with digital devices.

According to the results of this study, some distinctive aspects should be taken into account when designing online project-based learning with subjects highly linked with places, such as the one of agri-food. In general, the design should consider more time and different communication channels to allow the teaching team, the entrepreneurs and the students to have a fruitful learning link. In particular, however, more research is needed to offer students a complete learning experience in this field. It should be stressed that the process and the outcomes have been successful for all involved players, as was the achievement of the learning outcomes: the transformative, co-created knowledge in the third space of learning was shaped. However, the experience of ‘the rural’, as the educational value of the environmental component, does not seem to have the same role in the offline/online paths.

It is anyway essential to increase the online work with rural companies and stakeholders, besides the emergency that characterised this experience. Relations with the place, and promotion of student learning in context, are relevant in any educational environment, but in particular, in rural areas, which are marked by depopulation and low innovation capacity. To pursue a sustainable living, we also need higher education students and graduates to be prepared to face local, not only international, labour markets. Additionally, digital transformation affects rural areas: although this issue is often referred to agriculture only, as new technology and devices, digital transformation will remarkably affect people and communities in their daily life, including learning and work. For these reasons, the university should provide meaningful learning experiences through online education, which offers the opportunity to work with the social and cultural environment of the reference region.

Limitations of the study

The study analyses a case with a limited sample of students during an emergency time that involved the entire life experience, which means during a national lockdown. Therefore, it should be considered that psychological and emotional status could have influenced both students’ performance and evaluation.

Authors’ statement

Theoretical introduction: A.C.; Methods, Findings: G.P. and A.C.; Discussion and Conclusions: jointly developed (G.P., A.C.). Authors have read and agreed to the published version of the manuscript.

References

- Aleffi C., Tomasi S., Ferrara C., Santini C., Paviotti G., Baldoni F., Cavicchi A. (2020). Universities and wineries: Supporting sustainable development in disadvantaged rural areas. *Agriculture*, vol. 10, p. 1-14
- Annarajula, M., & Trifts, J. W. (2012). Business Consulting Projects. *Journal of Teaching in International Business*, 23(3), 222–235. <https://doi.org/10.1080/08975930.2012.744632>
- Azmitia, M. (2013). Peer interactive minds: Developmental, theoretical, and methodological issues. *Learning Relationships in the Classroom*, January 1996, 207–234.

- Barrows, H. S. (1996). Problem-based learning in medicine and beyond: A brief overview. *New Directions for Teaching and Learning*, 1996(68), 3–12. <https://doi.org/10.1002/tl.37219966804>
- Bell, S. (2010). Project-Based Learning for the 21st Century: Skills for the Future. *The Clearing House*, 83, 39–43. <https://doi.org/10.1080/00098650903505415>
- Boud, D., & Feletti, G. (1997). *The Challenge of Problem-based Learning* (2nd ed.). Kogan.
- Brunori, G., Rossi, A., & Malandrin, V. (2010). Co-producing Transition: Innovation Processes in Farms Adhering to Solidarity-based Purchase Groups (GAS) in Tuscany, Italy. *International Journal of Sociology in Agriculture and Food*, 18(1), 28–53.
- Calnan, R. R., Cours, D. A., & Stallings Williams, M. (2019). Journal of Education for Business Connecting to the real world: Incorporating student consulting projects in real estate programs Connecting to the real world: Incorporating student consulting projects in real estate programs. <https://doi.org/10.1080/08832323.2019.1599796>
- Cook, R. G., & Belliveau, P. (2006). *The Experiential Student Team Consulting Process*. Custom Pub.
- Cook, R. G., & Campbell, D. K. (2006). *The Experiential Student Team Consulting Process: A Problem-Based Model for Consulting and Service-Learning*. Custom Pub.
- De Hoyos, M., & Green, A. (2011). Recruitment and retention issues in rural labour markets. *Journal of Rural Studies*, 27(2), 171–180. <https://doi.org/10.1016/j.jrurstud.2010.12.003>
- Eurostat - Statistics Explained. (2018). Small and large farms in the EU - statistics from the farm structure survey. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Small_and_large_farms_in_the_EU_-_statistics_from_the_farm_structure_survey&oldid=406560
- Evans, N. J. (1993). The pluriactivity, part-time farming, and farm diversification debate. In *Environment and Planning A* (Vol. 25).
- Faggio, G., & Silva, O. (2014). Self-employment and entrepreneurship in urban and rural labour markets. *Journal of Urban Economics*, 84, 67–85. <https://doi.org/10.1016/j.jue.2014.09.001>
- Harris, B.N, McCarthy, P.C., Wright, A.M., Schutz, H., Boersma, K.S., Shepherd, S.L., Manning, L.A., Malish, J.L. & Ellington, R.M. (2020). From panic to pedagogy: Using online active learning to promote inclusive instruction in ecology and evolutionary biology courses and beyond. *Academic Practice in Ecology and Evolution*, 10:12581-12612. <https://doi.org/10.1002/ece3.6915>
- Hart, J. (2019). Interdisciplinary project-based learning as a means of developing employability skills in undergraduate science degree programs. *Journal of Teaching and Learning for Graduate Employability*, 10(2), 50–66. <https://doi.org/10.21153/jtlge2019vol10no2art827>
- Helle, L., Tynjälä, P., & Olkinuora, E. (2006). Project-based learning in post-secondary education - Theory, practice and rubber slingshots. *Higher Education*, 51(2), 287–314. <https://doi.org/10.1007/s10734-004-6386-5>
- Henke, J. W. (1985). Bringing Reality to the Introductory Marketing Student. *Journal of Marketing Education*, 7(3), 59–71. <https://doi.org/10.1177/027347538500700310>
- Heriot, K. C., Cook, R., Jones, R. C., & Simpson, L. (2008). The Use of Student Consulting Projects as an Active Learning Pedagogy: A Case Study in a Production/Operations Management Course. *Decision Sciences Journal of Innovative Education*, 6(2), 463–481. <https://doi.org/10.1111/j.1540-4609.2008.00186.x>
- Hosseini, S., Frank, L., Fridgen, G. & Heger, S. (2018). Do Not Forget About Smart Towns. *Business & Information System Engineering*, 60, 243–257 (2018). <https://doi-org.ezproxy.ub.gu.se/10.1007/s12599-018-0536-2>
- Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, 19(3), 267–277. <https://doi.org/10.1177/1365480216659733>
- Kolmos, A., Egelund, J., Nicolaj, H. & Clausen, R., Holgaard, J. E., & Clausen, N. R. (2020). Progression of student self-assessed learning outcomes in systemic PBL. <https://doi.org/10.1080/03043797.2020.1789070>
- Krajcik, J. S., & Blumenfeld, P. C. (2006). Project-Based Learning. In *The Cambridge Handbook of the Learning Sciences*.
- Krueger, R. (2002). *Designing and Conducting Focus Group Interviews*. University of Minnesota, USA. <https://www.eiu.edu/ihec/Krueger-FocusGroupInterviews.pdf>
- Maleki, R. A. (2009). Business and Industry Project-Based Capstone Courses: Selecting Projects and Assessing Learning Outcomes. *Industry and Higher Education*, 23(2), 91–102. <https://doi.org/10.5367/000000009788146647>
- Palmer, S., & Hall, W. (2011). An evaluation of a project-based learning initiative in engineering education. *European Journal of Engineering Education*, 36(4), 357–365. <https://doi.org/10.1080/03043797.2011.593095>
- Patton, M.Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Service Research Dec*, 34(5 Pt 2):1189-1208.

- Paviotti, G. (2020). 'Regional Universities' and Pedagogy. Graduate Employability in Rural Labour Markets. PALGRAVE PIVOT, p. 1-137, LONDON: Palgrave Macmillan
- Qualters, C. W. (2010). Experiential Education: Making the Most of Learning Outside the Classroom, *New Directions for Teaching and Learning*, 124, 95-99
- Ray, C. (1998). Culture, Intellectual Property and Territorial Rural Development. *Sociologia Ruralis*, 38(1), 3–20. <https://doi.org/10.1111/1467-9523.00060>
- Roberts, E., Anderson, B.A., Skerratt, S. & Farrington, J. (2017). A review of the rural-digital policy agenda from a community resilience perspective. *Journal of Rural Studies*, Volume 54: 372-385. <https://doi.org/10.1016/j.jrurstud.2016.03.001>.
- Roessingh, H., & Chambers, W. (2011). Project-Based Learning and Pedagogy in Teacher Preparation: Staking Out the Theoretical Mid-Ground. *International Journal of Teaching and Learning in Higher Education*, 23(1), 60–71. <http://www.isetl.org/ijtlhe/>
- Tanentzap, A. J., Lamb, A., Walker, S., & Farmer, A. (2015). Resolving Conflicts between Agriculture and the Natural Environment. *PLoS Biology*, 13(9). <https://doi.org/10.1371/journal.pbio.1002242>
- Wildlife and Countryside Link. (2019). Saving the environment is more important to farmers than subsidising food productivity. <https://www.wcl.org.uk/saving-environment-important-to-farmers.asp>