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Handbook of Research on Active Learning and Student Engagement in Higher Education

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IGI Global
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Chapter 12
Mobilizing Research–Based Learning (RBL) in Higher Education:
International Perspectives From Three Institutions

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ABSTRACT

This chapter makes a case for the importance of research-based learning (RBL) from a comparative international point of view. It highlights traditions that have shaped RBL modules for universities, as suggested by cases in Finland, Australia, and Germany. Although the three institutions diverge in their histories and study programs, they include an element of RBL beyond the traditional research-driven thesis projects in undergraduate and postgraduate degrees. A combination of both collaborative auto-ethnographic narratives of academics and student perceptions assisted in capturing RBL as a trans-formative teaching strategy. RBL has proven to be a convenient toolkit to tackle current societal issues beyond academic endeavors. It is also a way to develop relevant skills for graduate employability in a digital world.

INTRODUCTION

Research, an integral part of higher education, plays a key role in producing ideas, knowledge, and innovation. In addition, it is indispensable for the future of humanity. Research-based learning (RBL), also known as inquiry-based learning, can be seen as a transformational educational experience. It provides students with an opportunity to develop research skills in preparation for better employment opportunities, career readiness, and postgraduate research. Overall, it can significantly expand students' depth and breadth of learning. Students become acquainted with independent thinking skills, become confident in raising and framing questions, review the literature, collect and analyze the data, and derive answers to communicate results (Ahdika, 2017; Maass & Artigue, 2013; Spronken-Smith & Walker, 2010). At the same time, students benefit from RBL opportunities and develop essential critical thinking and problem-solving skills needed throughout their lives (Branch, 2003). Tertiary institutions worldwide have taken contingent-based approaches to embed research learning components at the under- and postgraduate levels in response to contemporary demands and needs. Further, incorporating research in learning and teaching assists academics in meeting the demands of new knowledge creation to enhance institutional research output.

RBL has assumed greater significance in a post-pandemic world because it generates innovative solutions, knowledge, and ideas to address challenges identified during the pandemic. To date, there is little agreement on an overarching framework to embed RBL in curricula (Killinger et al., 2016; Willison, 2018). Several questions should be considered. First, can other learning strategies and their benefits replace an additional research year at the undergraduate level? Second, why are academics motivated to embed RBL? There is an urgent need to revisit RBL and examine its application at an international level to ascertain if valuable lessons can be learned through a cross-jurisdictional analysis, particularly academics' role in instigating RBL and the students in this process.

The objective was to examine how RBL is operationalized in undergraduate business programs at the following locations: JAMK University of Applied Sciences in Finland, Zeppelin University (ZU) in Germany, and Western Sydney University (WSU) in Australia. In addition, the study aimed to explore the relationship between the academics as drivers of RBL and students as active co-drivers of RBL, including if student perceptions of RBL provided valuable experiences. Data for this study was collected through auto-ethnographic narratives of the authors and interviews with the students.

RBL BACKGROUND AND EXAMPLES

A large and growing body of literature has emphasized the importance of RBL. Huber (2014 cited in Wessels et al., 2020) defined RBL as an instructional format in which students work through the entire research process in a self-regulated manner, guided by their research questions. The design of RBL emphasizes the research process and problems rather than content. It treats students as participants rather than an audience (Healey, 2005).

The research process includes the learning paradigm, which explores existing knowledge through literature review, and the discovery paradigm or empirical study (Levy & Petrulis, 2012). Inquiry-driven learning requires students to use scientific reasoning and critical thinking when combining scientific knowledge and processes to generate a perception of science (Bianchini & Colburn, 2000; Duran & Dokme, 2016). Students learn through cause and effect, relational and critical thinking, and combining

scientific knowledge and operations. Critical-thinking skills are developed through discovery and investigation in authentic settings (Acar & Tuncdogan, 2019; Stanford et al., 2017; Wartono et al., 2019). Thus, no research project and approach are the same.

RBL can create an inclusive research-based academic community and improve learning, especially for low-achieving students (Smith & Rust, 2011). It develops students' science literacy and research skills while establishing close relationships between educators and students (Brew & Jewell, 2012). Despite these advantages, the focus shifts from content to process. Thus, academics may feel insecure about succeeding and may fear the adoption of RBL (Justice et al., 2009). Some students may resist the process because RBL demands more cognitive effort, patience, and tolerance (Gormally et al., 2009). Nevertheless, once these challenges are overcome, a shift to RBL can prepare students to embrace uncertainties in their future workplace (Brew & Jewell, 2012).

Willison and O'Regan (2007) advocated that a lifelong learning endeavor is created from developing research skills through research output. Wessels et al. (2020) concluded that RBL is an effective instructional format for enhancing research knowledge and research-related uncertainty tolerance. The RBL decision-making wheel model by Brew (2013) recognizes the importance of RBL in developing student autonomy, providing a rational framework for designing RBL curricula and pedagogy. In particular, RBL courses prove effective when students think the RBL experience can help in future employment opportunities.

John and Creighton (2011) emphasized that conducting research is an incredibly demanding task that requires students to handle uncertainties and manifold frustrations. The complexity of successfully embedding RBL lies in how university educators translate research into learning experiences (Wilson et al., 2012). This depends on how they, as individual researchers and educators, define research and understand RBL. Scholars suggest that students struggle to undertake research despite the recognized benefits linked to graduate employability and essential skill development for life. For example, if the student has not encountered prior challenges, they might not have acquired skills to succeed in research (DeHaan, 2009; Evans & Witkosky, 2004). Harrison and Whalley (2008) wondered whether undergraduate students have the fundamentals to engage in research and question what they have learned throughout their undergraduate education. Lovitts (2005) queried whether students are prepared to engage and embrace research tasks at the postgraduate level.

Hughes (2019) claimed that research skills should be viewed as threshold concepts. In addition, transforming and building a student's research capacity must be built over a program, which requires coherent research skill development and progressive assessment. There is no clear framework regarding RBL; therefore, it is open to interpretation. Institutions often lack qualified, experienced staff who possess the appropriate knowledge and expertise to implement RBL. In addition, the staff may not be skilled in engaging students who can deal with unexpected problems that may arise during their research experience (Hong Sharon Yam & Rossini, 2010).

Globalization, COVID-19, rapid advances in technology, and a competitive workforce have heightened industry expectations for graduates to be equipped with skills to contribute and succeed in the post-pandemic workplace. Cukier et al.s (2021) cited the 2020 World Economic Forum Report, highlighting the importance of critical thinking analysis as an outcome of undertaking research. These skills will be needed to respond to the demands of a post-pandemic recovery. In this regard, universities, in their role as "intermediaries," are well-positioned to connect work and education as the world moves toward a post-pandemic future (Marcus, 2020).

To meet these demands, universities must be proactive in providing opportunities for their students to develop relevant skills during their studies to achieve graduate employability. In reviews from the Council of Undergraduate Research (CUR), Shanahan et al. (2017) pointed out that undergraduate research has moved from an elective activity conducted by many academics and students to become a vital component of the undergraduate student experience at many institutions. The integration of teaching and research has been discussed and practiced since the 1970s. In Germany, it was even part of a political movement, demanding that undergraduate students participate in scientific practice, in which research and teaching and research and learning were seen as connected (Mieg, 2019). The Boyer Commission on Educating Undergraduates in the Research University (1998) called for integrating research activities into undergraduate curricula in the United States. In parallel, the government of the United Kingdom elevated the importance of the development of employability skills to share equal status with research and teaching activities (Department for Innovation, 2007).

Given the importance of soft skill expectations in the workplace, employers tend to view that universities should not only develop technical skills but should also play a significant role and assume responsibility in the development of these soft skills to produce professional graduates (Howieson et al., 2014; Jackson et al., 2017). There is, thus, a growing recognition for the development of research skills for better employability, as well as an increasing amount of research on the pedagogy of RBL (Aditomo & Klieme, 2020; Lambert, 2009; Walkington et al., 2011). RBL implies a meaningful change from traditional lectures by facilitating a collaborative environment where students are consumers and producers of ideas or knowledge, and teachers are co-learners (Lambert, 2009).

RBL has been portrayed as an effective instructional format dominated by studies from science, technology, engineering, and mathematics (STEM) faculties (Wells et al., 2020). Still, evidence from the social sciences remains scarce. The studies suggest both benefits and challenges in RBL. Yet, limited research investigates variations in how RBL is employed and implemented in higher education (Aditomo et al., 2013; Burkhardt & Schoenfeld, 2003; Maass & Artigue, 2013). There does not appear to be a best practice approach for higher education institutions to use as a baseline to develop and strengthen RBL as an effective pedagogic device that satisfies the needs of all stakeholders. This indicates a need to understand the application of RBL at an undergraduate level and expand an understanding of this through an international perspective. An examination of academic and student experiences of RBL in disparate geographies would reveal any scope for a potential best practice approach. It would also highlight lessons to be learned in providing concrete student experiences that would be deemed valuable by future employers.

First, this chapter describes RBL, highlighting its importance as an intellectual endeavor and a way to move beyond the confines of academia to address societal problems that demand solutions. Universities and leaders in RBL have been at the forefront of examining how research can be embedded in curricula. Tertiary education providers incorporate employer demands of seeking work-ready graduates with transferrable workplace skills. Second, this chapter illustrates how RBL is embedded in undergraduate levels in business schools at JAMK University of Applied Sciences in Finland, ZU in Germany, and WSU in Australia. Each university is introduced as a separate case. The research orientation of the institutions and the higher education sector in each country is provided with a brief description of how RBL is operationalized.

JAMK University of Applied Sciences - Finland

The Finnish higher education system comprises 13 universities and 23 universities of applied sciences. Research is a core activity in institutions. Traditionally, universities prioritized basic research. Universities of applied sciences conducted applied research in collaboration with local industries. Under international pressures for accreditation, the two institutions' intentions in research activities have converged. As a result, the percentage of faculty with doctoral degrees and the number of academic publications have been increasing at the universities of applied sciences.

Finland had a research and development (R&D) expenditure of €6.7 billion (2.79% of gross domestic product [GDP] in 2019), out of which 1.7 billion (25.5% of all R&D expenditures) belonged to higher education institutions (Statistics Finland, 2020). The share of higher education institutions' role in the Finnish R&D ecosystem has been rising since 2011, accounting for 20.0% of all R&D expenditures (Statistics Finland, 2020). Student involvement in research activities occurs mostly at the doctoral level, which is offered at the universities but not at the universities of applied sciences. At the undergraduate and postgraduate degree level in both universities and universities of applied sciences, research is integrated into studies as the finishing project or "thesis." In the thesis, students review literature, identify research questions, and apply a scientific method to answer the questions under the guidance of thesis supervisors.

JAMK University of Applied Sciences is one of two higher education institutions in the city of Jyväskylä. It is in central Finland, about 270 km north of Helsinki, the capital. Its four schools offer undergraduate degrees and postgraduate degrees to 8,500 students. These include the School of Technology, School of Business (SoB), School of Health and Social Studies, and School of Professional Teacher Education.

Owned by the city of Jyväskylä (holding 90% of the shares), JAMK University of Applied Sciences had a turnover of €59.8 million and a staff of 743 in 2019 (JAMK University of Applied Sciences, 2021a). The main sources of turnover were educational services (accounting for 80%) and R&D activities (accounting for 12%; JAMK University of Applied Sciences, n.d.a.).

Applied research at JAMK University of Applied Sciences is concentrated in the strategic focus areas of bioeconomy, multidisciplinary rehabilitation, applied cybersecurity, and the emerging fields of innovative learning, tourism, and automation and robotics (JAMK University of Applied Sciences, n.d.b.). Main sources of external R&D funding include funds from the European Union (accounting for 56% of all R&D funds) and public funds in Finland (accounting for 35% of all R&D funds; JAMK University of Applied Sciences, n.d.b.). In the university's 2020-2030 strategy of "creating competence," R&D activities are vital for renewing the competencies of faculty and improving the competitiveness of local businesses (JAMK University of Applied Sciences, n.d.b.).

Student involvement in RBL at JAMK University of Applied Sciences occurs through theses and applied R&D projects. The thesis, as the more common route, is a large R&D project worth 15 credits at the undergraduate degree and 30 credits at the postgraduate degree. It is conducted individually (and, in some rare cases, in pairs) during the last year of studies under the supervision of appointed faculty. The thesis process starts with the development of a research plan based on a literature review and the identification of a real-world problem in working life. For postgraduate students who are employed, the thesis is a development project at their workplace. For undergraduate students, it is carried out at companies where they do their practical training. The research problem is delineated into focused research questions and answered following the review of relevant literature and the conduit of an empirical study using an appropriate research method.

The empirical study involves collecting and analyzing relevant data from the field. In the final stage of their thesis, students present and discuss their findings in writing and a presentation to an audience of faculty and students. The written thesis is pre-evaluated by the thesis supervisor and a second reader. The final grade is given following its evaluation by the thesis committee.

Applied research projects, on the other hand, tend to be ad-hoc committees. Faculty who join R&D activities in cooperation with the R&D unit may involve their students in their real-world projects conducted with local businesses. Students usually work in groups on these projects. They receive either project credit or course credit upon completion.

An innovative RBL initiative was undertaken at the undergraduate program in international business at the SoB in 2015. The degree program restructured the second year as a research-oriented "academic year," moving the thesis process from the fourth year to the second year. In addition, two research methods courses were transferred to the first year of the program to better prepare students for the second year. Upon completing the first year, students selected one of the seven academic tracks to pursue their specialisation. They developed their thesis ideas and completed their work during the second year. Preliminary results from this initiative suggest that a year-long collaboration between students and academic track teachers (who become students' thesis supervisors and career tutors) improves students' learning performance.

ZU - Germany

In its efforts to promote RBL, ZU is guided by the Humboldtian ideal of education. It is significantly influenced by the idea that education should not focus on a specific subject. Instead, it should focus on education in the spirit of humanism or enlightenment (Berglar, 1970). Wilhelm von Humboldt, one of two Humboldt brothers, presented his ideas on higher education in 19th century Prussia. He advocated for the unity of teaching and research to create autonomous global citizens (Keuser, 2019). According to Humboldt, a prerequisite in the central concepts of autonomy and cosmopolitanism is the focus on integrating research and teaching or the interplay of organized knowledge transfer and original research (Keuser, 2019). Based on this historical background, it appears that RBL should be thoroughly embedded in German higher education; however, the reality is prosaic. It was not until 1970 that RBL was put back on the educational policy agenda by a letter from the "Bundesassistentenkonferenz" (1970).

Obviously, there are several moments in a student's lifecycle when they can pursue original research. However, in the original version, Humboldt's ideas were aimed at a small, financially secure elite (Krull, 2015). The Humboldtian ideal of education was never designed to be used in the mass universities of the 20th and 21st centuries. In particular, the Bologna Process has further accelerated an economization of degree programs in Germany and Europe. As a result, most German state-funded universities cannot include compulsory research modules in undergraduate and postgraduate courses. This is simply reasoned ast RBL requires an administrative apparatus and infrastructure capable of responding to students' individual needs in research projects. Most state-funded universities, which serve up to 50,000 students, cannot provide these administrative resources. Therefore, it is not surprising that most students can only conduct research projects when they work as student research assistants, support research projects of senior researchers, or teach introductory courses.

The overarching question that arises from this mismatch between ideal and educational fact is how to implement RBL in a contemporary and effective way against the background of pitfalls. ZU's approach is based on the Anglo-American tradition of undergraduate research. Several questions played a role in establishing student research at ZU. First, how can a faculty or university best focus on achieving an

interdiscplinary approach? Second, what should flexible curricula look like when establishing research-oriented modules? Third, what forms of RBL are needed and able to be incorporated into the curriculum?

Huber (2014) divided RBL into three schematic forms: (1) learning based on academic-driven research results; (2) research-oriented learning; and (3) student-centric RBL. ZU included student-centric RBL into their programs to give students the highest freedom in conducting their research projects. The university implemented RBL in all undergraduate programs in a dual student research approach consisting of a Zeppelin project at the beginning of the program and a voluntary research module in the second half of the students' lifecycle in the Humboldt project.

From the beginning of their degree program, ZU students deal with questions and problems for which new insights can be found through research. The Zeppelin project, which is always based on a general topic, is selected according to interdisciplinary openness, disciplinary precision, and social relevance criteria. Within the framework of this project, students learn about the opportunities and challenges that science and research offer at the beginning of their studies. At the start of the actual project, students receive suggestions from professors in various disciplines. Subsequently, the students develop their interdisciplinary research question and identify a professor who can support their work. There is a deliberate strategy to overwhelm students to contact scientific reality in a quick and unfiltered manner. ZU believes the strategy will provide an intense learning process for understanding scientific working methods. Of course, a dedicated support network of informational events and extensive supervision is essential. In exceptional cases, outstanding Zeppelin projects can be scientifically published, which underlines the approach's success at ZU (cf. Schliebs et al., 2017).

Students can establish their scientific focus and shape their studies in the Humboldt project at an advanced degree program. This allows students to pursue their research interests and deepen their understanding of certain topics. They can either apply for or develop their own ideas for a research project. This voluntary module, in a sense, represents the students' first "adult" steps in research. They independently undergo the complete research process while under the supervision of an expert and without an extensive informational support network. The Humboldt project should fulfill the criteria for at least a first theoretical scientific publication in scope and depth. This approach has been successful. Several projects have been published in anthologies (several chapters in Baumann Montecinos et al. [2020]) and scientific journals (cf. Fidrmuc & Lind, 2020).

WSU - Australia

Australia has 41 universities, of which 37 are public. Compared to Europe, it does not have long traditions in higher education. It has been suggested that the Dawkins reforms of the late 1980s shaped the Australian higher education landscape (King & James, 2014). Australia has been actively involved with the Bologna process since 2009, leading to measures to promote international recognition of Australian degrees. With 11 campuses, WSU is a distinctively student-centered, research-led university. It is rated in the top 2% in the *Times Higher Education* world rankings. Over 85% of its research is recognized as "world standard or above" according to the Excellence in Research for Australia (ERA) evaluation (Universities Australia, 2021). WSU's (2020) Sustaining Success Strategic Plan 2021-2026 articulates transformation as a key principle, emphasizing that research programs address global challenges and highlight employability of its graduates.

Traditionally, an honors degree as an additional year at the undergraduate level has provided students with an opportunity to develop their research skills in preparation for PhD programs. However, this ap-

proach has not addressed the rigors and challenges of work beyond academia, as noted by Horstmanshof and Boyd (2019). Further, close industry collaboration revealed employer dissatisfaction with graduates' inabilities to effectively contribute to the workplace because they lacked soft skills and practical hands-on experience (Boud, 1993; Murphy et al., 2003; Sarkar et al., 2016; Zlotkowski, 1996). This gap provided the impetus for universities to implement teaching and curricula development measures to increase employability and the career prospects of graduates, especially in an increasingly dynamic and competitive environment. The importance of employability of graduates is not just applicable to Australia. It is recognized internationally (Boden & Nedeva, 2010).

Some schools in Australia's Group of 8 (Go8) universities still offer an honors program for research. The WSU SoB adopted a work-integrated learning (WIL) model to prepare students for employment in the 21st century. This model includes project-based learning, case-based teaching, and simulation, as well as opportunities for students to engage in primary and secondary research with RBL. Such learning initiatives engage students in practical experiences, applying theory and academic knowledge that aligns with research-based practice in work. WIL leads to beneficial outcomes, including: (1) student-centric teaching and engagement; (2) industry research projects; and (3) the nurturing of local strategic partnerships via transformative learning opportunities. In its broadest sense, inquiry or RBL can be seen as an umbrella term to describe a learning process through inquiry (Hutchings, 2007).

The WSU SoB adopted and integrated WIL and RBL components. This capstone or final unit, offered to under- and postgraduate business students, includes a flexible, practical hands-on WIL component. The postgraduate program lasts 10 weeks. The undergraduate program lasts 14 weeks. The units' designs bring life to the knowledge gained during the students' study. Students apply the knowledge to diverse business contexts through a WIL project and research. The projects are built on comprehensive, coherent, and connected knowledge gained in business specializations. This allows the students to explore and develop recommendations to meet project deliverables. The WIL project-based learning units provide students with on-the-job exposure and invaluable work experience as they complete a consulting project assigned by the employer. An additional unit, the Business Report, was introduced as an elective in pre-pandemic 2020. The unit focused on deepening the collaboration between international university partners and industry, providing cross-border collaborative research in the spirit of the Bologna Process and exposing domestic students without honors to research with international students.

In addition, WSU initiated RBL in a university-wide summer scholarship program, allowing undergraduate students to participate in an industry partnership summer scholarship or the traditional academic university summer scholarship. Summer scholarships allow undergraduates to experience academic research. The industry partnership asks the student to work on and solve industry-defined problems. The traditional academic summer scholarship scheme allows students to work on a research project with an academic to gain exposure to research. Students apply to be part of the summer scholarship program with academic involvement. Each selected student receives $3,500 for the duration of the Australian summer break (December through February). They must present their findings and a research report to other summer scholars, university executives, and academics. This program provides undergraduate students with insights into the role of a research assistant and exposure to working on supervised research projects.

CROSS-INSTITUTIONAL PERSPECTIVES

As mentioned in the literature review, there are positive outcomes for embedding RBL in curricula. Research is a demanding task; therefore, understanding and applying it varies depending on individual institutional approaches. The three universities have different approaches and distinct contextual factors related to embedding RBL. For example, ZU's combination of the Humboldtian approach and RBL approach resulted from an in-depth questioning of all facets of RBL.

Interestingly, all three cases show a strong relationship between academics and students who engage in the research process. The two stakeholders may have a symbiotic relationship because one cannot exist without the other. However, this relationship is not without challenges. It may lead to resistance from both academics and students. This symbiotic relationship also extends to other stakeholders, such as employers or national and international bodies that set standards as part of the accreditation process. Data was collected from students through focus groups and semi-structured interviews to investigate the core relationship between the academic and student. This data could reveal a better understanding of both academics and students in the RBL process, identifying the environmental factors supporting and hindering RBL. These students were enrolled in pre-pandemic face-to-face RBL sessions at the three institutions.

The researchers employed collaborative auto-ethnography as a "pragmatic application of the auto-ethnographic approach to social research" (Chang et al., 2013, p. 21). This enabled the authors to understand the academic role in RBL and the institutional complexities and challenges that can either hinder or support this active learning strategy in higher education. The approach encouraged different viewpoints by engaging all contributors as authors with an equitable voice in the design of this study. In doing so, collaborative auto-ethnography created a more inclusive and rigorous approach to engaging with individual perspectives than solo auto-ethnography when reflecting on RBL experiences (Lapadat, 2017). Data collected was analyzed according to the research objectives. The findings indicated several emergent themes from the auto-ethnographic narratives and the student interviews. The following two sections present the data. The first section investigates the perspectives of academics. The second section is the student perspectives of the RBL process.

The Academic's Role in RBL

This section draws on the analysis of the auto-ethnographic narratives of the authors in their roles as academics involved in implementing RBL in their respective institutions. Interestingly, the data reveals similar intrinsic and extrinsic reasons as to why the academics commenced and continue to engage with RBL despite variations in its application. This is consistent with suggestions by Maass and Artigue (2013).

All three institutions acknowledged that RBL was a platform used to develop students and build on one's (the academics) research skills. The narratives highlighted that student-centric academics were enablers of RBL. These academics also identified and acted on students' needs; hence, all three cases improved their RBL-related teaching practices. Students were assisted with expanding their research skills, including increased research output. This was, therefore, acknowledged as a prime objective of RBL, encouraging both research-active faculty to publish and students to develop research skills. Close collaboration between industry and university was accepted as a vital element for the future of higher education. Thus, additional drivers of introducing a research program at the undergraduate level included

recognizing RBL as a lifelong learning opportunity for stakeholders and interconnecting researchers, industry, and students through research on business-identified problems.

The pursuit of RBL by academics is consistent with Wilson et al. (2012), noting that academics face many challenges in the implementation of RBL. Details on the set up of an effective RBL active learning initiative is discussed in the following section, providing instruction on the actions that should be taken by academics to manage complexities and hindrances. These can be considered as factors that contribute to success.

Factors Driving the "How-To" Set Up

In terms of setting up RBL, the narratives reflected a need for a student-centric educational focus and academics who take on individual program leadership. One commented:

I simply wanted to be a good teacher… was prepared to "go the extra mile" to help students learn and develop skills for life.

RBL can develop students' related competencies in problem-solving and can prepare them for working life after graduation. At the same time, it promotes deeper learning. The identification of the need for work readiness is not new in higher education. The literature discusses many programs and activities that aim to redesign education to meet the future needs of students. However, as the narratives indicate, RBL presents new challenges for students and simulates better real-world practices in business administration. Academics must guide students in developing their research. They must help students find the appropriate frameworks and methods to answer their research questions compared to approaches inherent in traditional courses.

In non-WIL programs, students are given questions, frameworks, and methods to answer routine and topical questions. In the student-centric approach, as acknowledged in the auto-ethnographies, selecting research topics of interest allows students to become more motivated and engaged in the learning process, positively affecting their learning performances. Hence, the RBL academic must be active in research and aware of current job market demands. Students will have to develop skills beyond the knowledge they learn in their study programs. The following comments illustrate this sentiment.

All the workload falls on the coordinator. Yes, we have flexibility; however, there is limited available support. As an academic, I must give students the best opportunity to be successful and develop essential skills demanded by the industry, especially as research skills at the undergraduate level is one of the areas that higher education needs to focus on.

Students need to understand why RBL is important. Within an ever-changing job market, hard skills and knowledge are not enough. Compressed study programs may not provide enough time for quality learning, including developing skills needed in the job market, such as problem-solving skills.

Cross-departmental collaboration is another critical factor for RBL program success. It is challenging to coordinate and align RBL with research skills and joint interests of faculty and students. Active research academics need to take on the coordination and supervisory role of RBL programs. They must

communicate the benefits of such programs to colleagues and across disciplines to promote involvement. The following comment highlights this need.

Close cooperation between faculty and students is incredibly important to overcome challenges in every stage during the thesis process. This collaboration is like a contract signed between two parties. The lack of commitment from one side will influence the process negatively.

However, the narratives acknowledge that this can be time-consuming. Furthermore, institutions need to provide academics with ongoing training in RBL. Academics must be motivated to take on RBL initiatives. Therefore, institutions should provide necessary time and resources.

An elaborate undertaking for the RBL academic is to initiate industry-university collaboration. There is close collaboration between industry and university in Finland and Germany as they support RBL and encourage students to engage in industry-related research projects. Australia, however, lags with industry involvement in the higher education sector. The academic must facilitate engagement between student and industry, ensuring that RBL is aligned with curriculum and desired learning outcomes. The academic assumes a research supervisory role while managing an industry-related RBL experience. In contrast, the industry partner performs the role of a client, providing research projects and acting as a mentor who enhances students' skill development.

Identified Complexities and Hindrances

The identified complexities include, but are not limited to, the allocation of resources and available institutional support. Individual program leadership was mentioned in the narratives as a vital element for success; however, institutions often neglect "who" is involved in RBL. The academics must be motivated to conduct research and publish. Those who do not have doctoral degrees are less likely to commit to RBL. An added layer of bureaucracy and workload regarding RBL was mentioned in the increasing emphasis on research ethics and integrity within European institutions.

There is a need to get research permission at my institution for research projects involving students and faculty. The approval process may take a few weeks … this now needs to be accounted for and taken into consideration.

An often-overlooked obstacle in a WIL-type hands-on program is the complexity of managing the collaboration between stakeholders (university, industry, students, and academic). In Finland, for example, R&D is perceived as a vital element for improving the competitiveness of Finnish companies in global markets. Therefore, engaging students in meaningful research projects becomes more accessible than in countries that lack such relationships. Industry representatives partnered with higher education are eager to collaborate and support students in their data collection. The German academics shared these sentiments. The complexity, thus, exists in countries with close industry-university bonds. Therefore, it is up to the academic to drive and initiate these relationships.

The narratives display an elevated confidence level about the academics' approach and ability to run RBL programs. Notwithstanding challenges and institutional hindrances, they perceive the RBL workload as a steppingstone toward a larger goal for their educational work and career of collaborating and publishing with students. One reported commonality demonstrates that each program enhances students'

soft skills development in critical thinking, communication, and problem-solving. Developing students' research skills in the preliminary stages of the undergraduate degree program was vital because their development will diminish misconceptions and negative attitudes of students toward RBL.

I call it the "grand plan," a research-based program that benefits students and can increase the collaboration between academics. However, it is a challenge to overcome an environment that is not supportive of such a program. You need to get all faculty behind your grand plan idea, or it is subject to fail.

Turning to solutions, the data reveals that once higher education institutions implement RBL, academic staff and administrative staff must undergo a transformation process. However, this must be professionally managed. RBL requires a shared vision. The team must understand how the program is built to support a student-centric approach.

When starting the program and launching an "innovative teaching approach" from scratch, you need multitasking skills, a positive attitude, efficiency, the right project, communication with peers, and time management skills.

One academic noted how programs can success with the right institutional support and acknowledgment.

Support from the administration to faculty is a success factor. This is especially important in guiding and supporting students during the research. Recently, [at our institution], more support has become available, namely internal funding for national and international conferences to support faculty to make publications from their research or joint research with their students.

A Social Activity Evidenced During COVID-19

This section outlines the views on how RBL is driven by inquiry to solve real-world problems. This can be applied inside individual courses, as research projects outside courses, or as bigger research projects for the thesis. As evident in the narratives, RBL is seen as a collaborative process. Students develop their research and problem-solving skills (e.g., critical thinking, analytical thinking) and communication and collaboration skills. When they conduct their empirical study, their collaboration skills develop during the thesis process with their supervisors, peer students, and representatives from industry. Their communication skills develop because they report and discuss their findings in written and verbal formats via presentations to other students and faculty or at student research conferences.

Reflecting on the impact of the pandemic on RBL initiatives, the narratives reveal that a shift to online environments resulted in difficulties for students. Despite all three cases moving their programs to online delivery modes, students missed in-person meetings with their peers and supervisors and engaging in regular face-to-face research activities.

We are a small university and personal contact to the supervisors is crucial to student research. We introduced an online approach during COVID-19; however, students prefer to engage in person. Student conferences were also held virtually but doing it in person is always preferred.

Furthermore, some students faced challenges in collecting company data during the pandemic. Interviews were conducted online because company visits were not allowed.

Students faced challenges in motivating themselves during the lock-down for this demanding and long [thesis] RBL activity. As a result, fewer students were able to accomplish their work in the targeted period.

One of the negative consequences in Australia was that the ban on international student arrivals led to an economic slowdown. Australian universities rely on international student tuition fees (Jayasuriya, 2021). At WSU, elective units were reduced or put on hold throughout 2020, including the elective RBL unit.

The pandemic created operational challenges related to running RBL programs. It also suggests that RBL is a social activity valued by students. Students and academic supervisors want face-to-face contact to progress individual research projects. In many instances, online sessions are inadequate.

… some things, such as research-based learning, cannot be moved online. It is not as simple as just offering content slides and asking students to engage in blended learning independently or asking questions when needed.

In summary, these results show that, despite challenges, the academic is "the driver" in RBL. The results also suggest that students value face-to-face interactions. Online modes do not always produce optimum results. A critical external factor, such as the global pandemic, indicates a need to examine RBL in a post-pandemic environment. The following section will examine findings from the student interviews (the "co-drivers" of RBL in this symbiotic relationship).

The student perspective

The institutional perspective provides interesting insights into the implementation of RBL. However, this perspective represents a small part of RBL in the day-to-day administrative context. It is, therefore, essential to know and illuminate the student perspective. For this reason, the three participating universities employ regular student evaluations of RBL activities. To identify key issues in the student perspective, this chapter draws on 18 interviews (12 at ZU, 2 at JAMK University of Applied Sciences, and 4 at WSU). Across all three universities, two points deserve particular attention. First, the chapter will discuss the ambiguous student perceptions and feelings about RBL. Second, the chapter will review the student-supervisor relationship.

Student Perceptions and Feelings About RBL

The initial image of RBL to students focused on their exposure to new challenges and opportunities that led to skills development. Some students felt scared because they were unfamiliar with doing research.

No panic right now. I have ample respect for research. Fear resonates. Lots of uncertainty and a queasy feeling because you do not quite know how the whole project should go […].

In addition, students were unclear on the benefits of RBL. After the RBL experience, students valued the process for its engagement, usefulness, and ability to develop their skills. The students argued that

the experience boosted self-confidence by improving written and verbal presentation skills, cultural awareness, time and project management skills, teamwork, networking skills, and the ability to think analytically and reflect critically. Some students mentioned that the RBL process allowed them to learn about themselves as they reflected on their strengths and matured their skills in certain areas. In general, the students expressed time concerns, worries, anticipation, and happiness about their ability to do scientific research.

[…] the excitement factor is there because you've never done anything like this before and now you can do scientific research at a university […].

As part of a student research project, 12 students in their first and second semesters at ZU were asked to reflect on their feelings about RBL (Bohnenkamp, Britzwein, Hofste, & Reiche, 2020). Responses were clustered in a word cloud according to perceptions and feelings expressed (see Figure 1). These feelings and perceptions coincide with the ambivalence presented. On the one hand, the students felt excited. On the other hand, they expressed nervousness, fear, and panic.

Figure 1. Word cloud derived from students' perceptions and feelings about RBL (the size of the word represents the emphasis given to it by respondents)

Students also felt that the research journey was a distinct experience compared to learning experiences in regular courses. For example, students were given more responsibility and flexibility in RBL, which contributed to developing their professional identities.

What is really different in research-based learning is the degree of independence … You're much freer in just choosing what you want to do, when you want to do it, and where you want to put your priorities.

In addition, RBL was more pragmatic. Students enjoyed putting their skills into practice while solving real-world problems. This form of learning was more sustainable than listening to a teacher in the classroom.

In most classes, you listen to someone who just talks for an hour ... I can't stand it ... I like to learn by discovering real things by myself.

Finally, the RBL research project was more comprehensive and lasted longer than regular course assignments. As a result, students needed more support during the RBL process, especially in the initial stages of the project as students formulated research questions and designed their empirical study. Guidance was also needed in the proper implementation of methodology.

You need guidance from the very beginning of the research project, especially when you are in the field. I think there should be a very sound foundation of methodological knowledge beforehand.

Student-Supervisor Relationship

Students emphasized the importance of dedicated, caring, and student-centric supervisors who were sensitive to their learning process, particularly for students with no prior research experience. In these instances, the supervisor's main contribution was recognized in the initial stages of the research project as they oriented students to the project and process.

So, I have to say, the project is also for learning how to do research. I think it's actually positive that he says, "Okay, I want this and this."

Students encountered challenges and frustration throughout the RBL process. They were able to overcome these challenges with the support of their supervisor and access to resources. Regular meetings with supervisors provided continuity of interactions, exchange of ideas, and valuable feedback. It also provided clarification of complex concepts, which motivated students and contributed to their learning process. A beneficial relationship between supervisor and student included trust, mutual respect, and ethics. In the eyes of the students, the supervisor should not be doing the work of the students. Instead, the supervisor should serve as a mentor or coach and provide guidance as needed.

It's best for the supervisor to give guidance to the student when it is needed … like someone I would call a mentor or someone I would approach to ask for help.

The supervisor should be student-centric because students differ in their research interests and skills. Some students require additional attention. According to the students, the supervisor should be an expert in the field of research, with experience and knowledge of how to do research.

[…] He has the willingness for the topic, puts in the effort, and has the scientific background and know-how. You cannot ask for more from a supervisor.

One student mentioned that the ideal supervisor should inspire students and be a future role model. Finally, the ideal supervisor should be accessible to students. However, the time factor was repeatedly mentioned in student evaluation. Most students felt they received strong supervision; however, supervisors' limited schedules impacted the experience.

Two (out of five points for supervision quality) because our supervisor had a lot of other things to do … we couldn't meet regularly.

Overall, a strong institutional background could ensure high-quality ongoing support. Nevertheless, it is an important task of the RBL department to be in constant contact with students and supervisors. This focus could foster a mutual understanding for any time issues that arise.

Some of the students conducted their RBL projects at a host university abroad under a home university and host university supervisor. This international format of student research combines the advantages of RBL with the general benefits of an international exchange. Although students felt it was unique, they also faced challenges. For example, supervisors from different institutions held different expectations related to the RBL project. One student's challenges turned into an issue when these differences were not clearly communicated to the student from the beginning. It could be a more pleasant experience if the co-supervisors communicated about the supervision process, providing clear and coherent instructions to the student throughout the process.

SOLUTIONS AND RECOMMENDATIONS

The three institutions in this study recognized complexities and challenges with RBL. Regarding the SoB at WSU, embedding RBL took a different approach with the WIL model. Regarding JAMK and ZU, RBL was embedded in a program that spanned several months. From an academic's perspective, RBL is a valuable pedagogical device. When supervising students, the supervisor drives the research learning initiatives and initiates collaboration between industry and academics. When successful, RBL provides beneficial results to the industry and contributes to student development and work-readiness skills.

This study's results are significant in three respects. First, RBL benefits students in developing the necessary skills for employability. Students acknowledged challenges; however, their confidence in managing a research project allowed them a certain degree of autonomy. Second, industry collaboration reinforces the need for research to solve real-world problems rather than focus on pure theory. Third, RBL-motivated academics can experience a form of altruism as they coauthor with their students.

Challenges associated with RBL deserve greater urgency as the world grapples with a post-pandemic recovery. RBL should, therefore, not be underestimated as just one learning strategy to aid with recovery. Based on the three case studies, RBL is a social activity. It reveals that collaboration, preferably face-to-face (between stakeholders, academic, student, and industry), is essential to learning through the research process. In addition, RBL cannot be seen as a static teaching approach; ongoing refinements are key to long-term success. RBL academics must have research expertise, including the capabilities to manage colleagues and students. Other requirements include innovation to steer RBL to enhance students' inquisitive research and critical thinking and problem-solving skills. In this respect, academics must find hybrid (online and face-to-face) delivery modes to provide more guidance and support during thesis writing and research.

FUTURE RESEARCH DIRECTIONS

The pandemic has had a major impact on the nature of learning and teaching in higher education. There is a wide range of approaches to RBL. This chapter offers initial insights into the experiences of three participating institutions. Therefore, this study should be seen as the first p piece of the puzzle towards building a more comprehensive understanding of RBL and its effects. The findings presented in this chapter suggest the importance of factoring in both the institutional-academic and student perspectives. It is essential to collect further data from both the institutional and student perspective to compile an extensive guide to the implementation and use of RBL.

The cases in this chapter compare heterogeneous (Anglo-American, Scandinavian, and German) higher education systems. More broadly, research is also needed to investigate the heterogeneous, country-specific differences because cross-national and international studies will result in more holistic views. To produce mutually beneficial outcomes, more research is needed to embed the social aspects of learning involving industry.

As noted, lockdowns and temporary shutdowns of industries due to the pandemic have hindered most student research and studies. This was evident in the hurdles faced by students, resulting in additional layers of stress and frustration. Further researchmight explore the impact of institutional factors on RBL and its key stakeholders, including the academic and student.

CONCLUSION

Digitalization and global, interconnected universities are a rich source of opportunity. Universities are tasked with producing new knowledge and providing students with the tools to contribute to this new knowledge. RBL enables students to develop research skills and explore engaging research questions. It also allows them to expand their hard, technical, and soft skills that are required in an evolving job market. In this way, students shape the direction of their studies, acting as active participants. The students may learn how to cope with challenges and frustrations as they hone their critical thinking skills.

This chapter makes a case for the importance of RBL from a comparative international point of view. It argues that there is an overall recognition for RBL as an instructional format in current systems of higher education. The three cases in this chapter display the ways in which RBL can be included in university curricula. WSU combines a practical, flexible learning component and demarcated research projects in the summer months. At JAMK University of Applied Sciences, students can conduct applied R&D projects in connection with their theses. At ZU, all bachelor's students begin with a group research project. Then, they may participate in a voluntary research project module during their studies. The designated time of RBL projects in the study program does not appear to influence the success of the initiatives. There are many similarities between the overall cycle of research projects and the administrative and academic mechanisms and/or hurdles in RBL projects.

The collaborative auto-ethnographic analysis revealed common themes, including coordinated communication across disciplines, facilitation of network initiatives to industry, and orchestration of administrative steps for all stakeholders (i.e., students, supervisors, industry). Some factors serve as catalysts for successfully implementing student research projects. For example, academic staff who demonstrate a hands-on mentality can achieve close cooperation between students and faculty. Challenges occurred when institutional support was limited, which added a bureaucracy obstacle.

Traditions have shaped RBL modules across universities, as illustrated in Finland, Australia, and Germany. The three institutions in this study diverge in their histories and programs. Still, they include RBL modules beyond mandatory research projects in an undergraduate and postgraduate thesis. These findings suggest a general shift in international higher education toward a more innovative teaching strategy, including research- and project-based learning initiatives. RBL assumes greater urgency as the world moves toward a COVID-19 endemic future. As a pedagogic device, RBL offers students the flexibility to meet their individual needs and determine the direction of their studies.

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KEY TERMS AND DEFINITIONS

Auto-Ethnography: A technique that captures the highly subjective and subjective experiences of a researcher. Inherent friction is caused by the researcher's role in production and analysis.

Honors Degree: An additional year of study at the undergraduate level in Australian universities. Students can sharpen their research skills, as well as begin their pathway to postgraduate programs.

Humboldt Project: An optional student research project the year before writing the bachelor's thesis. Students choose their topic in close cooperation with their professor. Students work on this project for one or two semesters (in addition to other courses). Results are presented at student research day, a biannual student research conference.

Research-Based Learning: A learning approach that focuses on the importance of research.

STEM: Major natural sciences of science, technology, engineering, and mathematics.

University of Applied Sciences: A higher education institution that offers degrees at undergraduate and postgraduate levels (not doctoral). This focuses on applied research.