

# Library-faculty collaboration in the light of a business administration bachelor's program:

## 'The Scientific Wave'

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### Abstract

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In contemporary digital society, information literacy is increasingly important and viewed as a necessary life skill for all ages, social groups, and professional sectors, hence also affecting higher education. Universities need to develop strategies and approaches to integrate these skills into course syllabi, assignments and assessments based on close library-faculty collaboration. However, librarians and faculty members in higher education traditionally often have separate agendas and limited collaboration. This paper illustrates the background and process of constructing a successful librarian-faculty partnership, as a shared framework entitled the 'Scientific Wave' throughout a bachelor's program in business administration to enhance students' critical thinking, research skills and information literacy in particular. A case study approach was applied, and data collection was conducted during 2014–2019. The outcomes of a shared framework and library-faculty collaboration are discussed from the perspectives of students, library, and faculty. Findings show that a shared framework based on close collaboration between librarians and faculty, strategic anchoring and visualization in curricula, syllabi, course objectives and assessments developed in line with the mission of the university have an impact on students' information literacy skills during their education and after graduation. The Scientific Wave is a co-designed continuous framework based on the separate but complementary skills of librarians and faculty to provide students with tools for critical and creative thinking, research skills and lifelong learning in today's digital society.

**Keywords:** information literacy, lifelong learning, library-faculty collaboration, higher education, curriculum, business administration, work-integrated learning

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## Introduction

According to the Swedish Higher Education Act, higher education should rest on a scientific or artistic basis and on proven experience, research, and development (SFS, 1992:1434). This paper illustrates the process of building a successful library-faculty partnership initiated as a quality improvement measure focusing on students' abilities to search, collect, evaluate, and critically interpret relevant publications (i.e., information literacy) to improve their overall research skills within the field of business administration.

Librarians and faculty members often have separate agendas focused on providing service and teaching yet are sometimes unaware of the benefits of collaboration (Stubblings & Franklin, 2006; Weiner, 2012). While often viewed as the sole responsibility of librarians, there is no reason information literacy should be an exclusive library concern (Garner, 2006). As pointed out by Solhaug and Jensen (2020), increased access to information requires good skills and systematic research strategies to retrieve relevant research results. Contemporary research skills include “skills in conducting thorough searches and documenting the search process in a transparent way” (p. 55). Thus, there is growing interest in university strategies for integrating these research skills into course syllabi and assignments based on library-faculty collaboration (Brasley, 2008; Ford et al., 2015; Monge & Friscaro-Pawlowski, 2014; Torres & Jansen, 2016).

In the aftermath of the Bologna Declaration (1999), information literacy has to a larger extent become a professional ability that employers request and expect (Ford et al., 2015; Smith & Edwards, 2012). Furthermore, UNESCO's policy and strategy document for media and information literacy declares that “Media and Information Literacy (MIL) is a basis for enhancing access to information and knowledge, freedom of expression, and quality education” (Kārklīņš, 2013, p. 7). Additionally, the matter of lifelong learning is accentuated, and information literacy is seen as “a lifelong endeavour of knowledge and learning” (Grizzle & Torras Calvo, 2013, p. 71). Most disciplines acknowledge the importance of information literacy and as pointed out by Wu and Lee Kendall (2006), Smith and Edwards (2012) and Houlihan et al. (2020), the ability to find, evaluate and use information is of major importance in the field of business administration and the business world. Hence, integration of information literacy skills into the business curriculum is vital for colleges and universities of business to significantly increase student learning outcomes and professional readiness (Atwong & Heichman Taylor, 2008; McInnis Bowers et al., 2009) while preparing students for “lifelong learning beyond graduation” (Wu & Lee Kendall, 2006, p. 93). Earlier research on information literacy within the field of business administration covers, e.g., information literacy skills for accounting students to prepare for critical thinking and decision-making when leaving the classroom and entering the workplace (Cunningham & Anderson, 2005), and information literacy related to marketing students' research skills (Rutledges & Maehler, 2003).

This paper illustrates the background and process of building a successful librarian-faculty partnership to integrate and enhance students' critical thinking, research skills and information literacy in the field of business administration within a three-year bachelor's program at the School of Business, Economics and IT at University West, Sweden during

2011–2019 by addressing the following research questions:

- (i) How can a successful library-faculty collaboration in higher education be constructed?
- (ii) What are the outcomes of library-faculty collaboration?

The two authors of this paper representing business administration faculty and the university library have been active in the collaborative process since 2011 as teacher and program coordinator, and liaison librarian. The process has been anchored in the respective divisions and the university, and is based on broad participation and involvement among colleagues.

### **Embedded librarianship and collaborative learning outcomes**

The separate agendas of librarians and faculty have long been recognized (Allen, 1982). Current research shows that “Effective instruction requires the professor and librarian to work together as partners to achieve a common goal” (Meulemans & Carr, 2013, p. 82). Inter-professional collaboration is thus highly recommended and an effective path to reach success (Burke, 2020; Solhaug & Jensen, 2020). Information literacy sessions conducted by librarians alone may send signals indicating ‘optional’ sessions and thus not an essential feature of the course or program (Robinson & Schlegl, 2004). This becomes especially clear if the teachers have limited involvement or knowledge of information literacy. Another challenge to embedded librarianship is the level of autonomy of faculty to design courses and assignments (Jumonville, 2014). Earlier research drew attention to the difficulties of convincing faculty of collaboration benefits (Brasley, 2008). Moreover, some teachers consider it to be ‘extra’ and time consuming or assume that students learn this in other courses (Weiner, 2012). Faculty development is thus vital to keep up with the ongoing digitalization of society and its effects on strategies for higher education, combining theory and practice in lifelong learning (Camblin & Steger, 2000; Monge & Frisicaro-Pawlow ski, 2014).

Studies of information-seeking behaviour of individuals is an emergent field of research (Weber et al., 2019). Earlier studies point out that individuals often apply “lower-level Web search tactics” (Civilcharran et al., 2015, p. 1) using search engines and sources such as Google or Wikipedia (Weber et al., 2019). Earlier research emphasizes that business faculties should encourage students to use high-quality information sources and advanced search strategies instead of choosing easily available versions. Deep level search strategies have shown a positive effect on students’ academic grades regardless of discipline, indicating the importance of introducing students to advanced search strategies early in higher education courses or programs (Dewald, 2005; Weber et al., 2019). The positive impact of information literacy sessions embedded in course assignments is demonstrated in studies and specifically the fact that students tend to value and appreciate the sessions more during their later years of study (MacMillan & MacKenzie, 2012). A library-designed teaching session entailing an important level of discipline relevance cannot compensate for lack of collaboration with

faculty and integration into course assignments. Furthermore, earlier studies show that student learning when only meeting the librarian once at ad hoc information literacy sessions, i.e., “one-shot library instructions” (Kvenild & Calkins, 2011, p. 123) is not successful in business administration courses.

The role of librarians is transforming to include more tasks related to teaching, learning and research support (Burke, 2020), often performed in teams in close collaboration with faculty, hence referred to as ‘embedded librarianship’ (Ford et al., 2015). Contemporary librarians often function as liaison dedicated to meet the needs of a specific discipline, building relationships with faculty and students over time (Solhaug & Jensen, 2020). However, this increases the need for a “collaborative learning outcomes-based approach” including mapping of disciplinary and library learning outcomes, curriculum planning, and assessment aimed to prepare students with information literacy skills to apply in their future professional life in a changing society (Ford et al., 2015, p. 32). There are calls for further research to explore the full range and benefits of embedding and integrating information literacy skills in higher education, as well as studies of immediate and long-term impacts on student learning (Burke, 2020; Ford et al., 2015; Solhaug & Jensen, 2020; Torres & Jansen, 2016).

## Methods

The empirical setting of this study is the three-year bachelor’s program in business administration at the School of Business, Economics, and IT at University West in Sweden. A bachelor’s thesis course of 15 ECTS completes the program. A qualitative case study approach was applied to study the phenomenon in its real context to reach a deep understanding of all informants’ perspectives (Yin, 2018).

**Case description.** The profile of University West is work-integrated learning, WIL, to enhance the collaborative relationship, flow of ideas and co-creation of knowledge between academia and society, and to encourage lifelong learning (University West, 2021). WIL is applied as a philosophy or systematic approach through all disciplines to combine theory and practice which permeates education, research, and collaboration with society. The library at University West relates to WIL by preparing students for the various demands from a society in constant change, which also includes formal requirements from current as well as potential employers. The existing collaboration between faculty and library with focus on information literacy and research skills is here viewed as one application of WIL (Olsson & Näverå, 2019).

All programs in higher education in Sweden should fulfil nationally stated learning outcomes. The Swedish Higher Education Authority (UKÄ) evaluates the quality of higher education and research (UKÄ, n.d.). During the evaluation of bachelor’s theses in business administration from University West in 2010 a lack of goal fulfilment for one of six criteria called for attention and supplementary improvement required in 2012–2013 regarding students’ ability to search, collect, evaluate and critically interpret relevant information and to

critically discuss phenomena, issues and situations.

In 2010 library-faculty collaboration at University West was mainly carried out as ad hoc solutions, i.e., ‘one-shot library instructions’ not integrated in courses or assignments, limited progression, and teachers rarely attended the sessions. Due to the results of the evaluation by the Swedish Higher Education Authority in 2012 the faculty in the business administration division invested time and effort to increase the overall quality of the bachelor’s program during 2012–2013. An initial critical review to identify and map all course elements that can strengthen the students’ information literacy in the field of business administration was performed jointly with the library. A more extensive faculty analysis of curricula, education plans, course contents, assessment, and progression of learning outcomes followed identifying issues to be improved, such as:

- clarify and set requirements to ensure the goal fulfilment related to students’ abilities to search, collect, evaluate, and critically interpret relevant information,
- provide opportunities for a systematic and course-integrated collaboration with the library to avoid fragmented courses and assignments,
- offer students opportunities to practice research skills, scientific approaches, and scientific methodology throughout the bachelor’s program,
- review and coordinate the bachelor’s thesis course by communicating a shared thesis guide and explicit requirements for assessment to guide students and teachers, to enhance skills in information literacy among teachers to limit students’ dependency on individual teachers’ skills.

The evaluation was an external forced point of departure, hence also an opportunity to initiate an internal review as a holistic quality improvement process that resulted in a shared framework entitled the Scientific Wave, that was implemented in 2013 and further applied and revised during the years 2014–2021 (University West, 2020). The Scientific Wave includes several aspects relevant for business administration, although the focus of this study is on library-faculty collaboration and information literacy.

**Data collection and analysis.** A literature search was conducted in several databases: Business Source Ultimate, Science Direct and Academic Search Premier, focused on key concepts such as information literacy, library, integration, collaboration, library-faculty, and academics. The search was performed iteratively from November 2018 to December 2021 to capture recent research within this field.

The methodology approach is qualitative and data collection is longitudinal including:

- 60 written student evaluations conducted during IL sessions 2014–2016
- Written surveys from five former students 2018–2019
- Four semi-structured interviews with business administration faculty 2019

All evaluations, surveys and interviews were performed with informed consent.

Furthermore, a comparative content analysis was conducted of in total 34 bachelor’s theses in business administration. The 17 bachelor theses from 2010 assessed by the Swedish

Higher Education Authority were compared to 17 bachelor's theses from 2019 with the same distribution of grades as the original sample, i.e., nine theses graded passed and eight passed with distinction. During the first round of the analysis both authors read the student theses to get an initial understanding of the sample of student theses for 2010 and 2019. During the second round of analysis, student theses were re-read with focus on information literacy. The themes applied for the content analysed were documentation of search strategy/no documentation of search strategy and number of scientific articles included.

All collected data were jointly analysed in several rounds. The two authors of this paper have furthermore practiced joint reflexive introspection inspired by Takhar-Lail and Chitakunye (2015) when describing and summarizing the collaboration process, since both authors have been active in the collaborative process since 2011 as the liaison librarian for the bachelor's program, and teacher and program coordinator. Chosen methodology for data collection and size of samples may of course affect the results. However, the longitudinal data covering 2014–2019 and the content analysis underpin the study.

## **Results and discussion**

The way to the scientific wave – the process of integrating information literacy. Using one-shot instructions to teach information literacy is not the optimal choice (Kvenild & Calkins, 2011), and in 2011 the University West Library initiated a process for a deeper collaboration between the teaching librarians and faculty. The process started by mapping different contact activities, initiating strategic meetings to co-plan teaching sessions, performing subject-specific and pedagogic collaboration as suggested by Ford et al. (2015). This paper is limited to the collaboration between the liaison librarian (two librarians 2010–2015, reduced to one librarian from 2015) and the business administration faculty (approximately 15 teachers) starting in 2011.

As pointed out in earlier research, one of the identified obstacles for collaboration was teachers' lack of knowledge and interest concerning library resources, corresponding to studies by Brasley (2008), Stubbings and Franklin (2006) and Weiner (2012), an initial presentation of the library's information resources was performed to enunciate the process around the teaching sessions for information literacy, e.g., reading course plans, getting familiar with theories, assignments, and groups of students. Furthermore, the importance of timing and the authority of a teacher's presence and involvement were stressed as significant factors contributing to the success of information literacy sessions. This is in line with Garner (2006) and Robinson and Schegl (2004), stressing the shared responsibility for information literacy.

The business administration faculty focused on internal reviews of courses in 2012–2013. Shared visions and a coherent program framework were planned. All course content, literature, learning outcomes and assessments were mapped, presented in a matrix, critically reviewed, and discussed, resulting in totally revised course curricula with a clear progression of courses throughout the program as well as shared thesis guidelines to be applied in all

written assignments during the bachelor's program. A step-by-step process was performed in meetings and workshops to carefully discuss, revise, and gradually anchor the ideas of the framework. As a result, the elements of information literacy were clearly stated in business administration course curricula, and the students' ability to search, collect, evaluate, and apply critical thinking and relevant information were assessed in accordance with the Swedish Higher Education Act (SFS 1992:1434). The process resulted in a shared framework entitled the Scientific Wave.

The liaison librarians were contacted to give their views on the framework and a phase of co-planning specific teaching sessions followed. The sessions were designed as co-teaching where the teacher introduced the course assignments and discipline-specific prerequisites, and the librarians presented relevant databases and search techniques and made a connection to the teacher's elucidation of the concept of science, followed by a workshop in the presence of both professional categories. One thing that may be identified as unique is the accentuation of the collaboration with the liaison librarians regarding information literacy, and it is stressed that information literacy is a skill achieved by continuous integration into disciplinary contexts as well as working life and society's demands. In the framework every information literacy session is placed within relevant courses, integrated into the course syllabus and assessments which also entails the accentuation of the ongoing progression throughout the program. The institutionalization of the framework is also visual as the librarians are also registered as teachers on the digital course platforms, which gives the opportunity to communicate and interact directly with individual students and teachers before and after the teaching sessions.

Consequently two development processes were connected to strengthen the library-faculty collaboration and embedment of information literacy within business administration courses, to strive for students' learning impacts demonstrated in earlier research (e.g., Atwong & Heichman Taylor, 2008; Burke, 2020; Meulemans & Carr, 2013; McInnis Bowers et al., 2009; Solhaug & Jensen, 2020).

**A shared framework – the scientific wave.** The total quality improvement process of the bachelor's program was summed up in the 'Scientific Wave' framework that was approved and anchored at University West during 2013 and then finally approved and assessed as high quality by the Swedish Higher Education Authority in November 2013.

The Scientific Wave aims to support the student's development during the bachelor's program to develop and strengthen the following skills: critical and analytical approach; written and oral presentation; and information literacy, to provide the prerequisites for achieving the learning outcomes of the curricula. (University West, 2018).

This process applies what Ford et al. (2015) refer to as a collaborative learning outcomes-based approach to IL-sessions. Since 2013 every IL session is co-taught by librarians and teachers. During workshops and the search process the students also deepen

their discipline competence. There is a minimum of five information literacy sessions during the bachelor's program and three examples are illustrated in Table 1.

Table 1.

*Examples of embedded information literacy sessions*

<b>Courses in business administration</b>	<b>Curricula - Learning outcomes related to information literacy Skills and abilities to:</b>	<b>Assessments related to information literacy</b>	<b>Information literacy sessions focused on:</b>
<b>First year</b> Marketing I - 7.5 HE credits	-search, collect, evaluate, and analyse market information and present own analyses of marketing phenomena	written reports presented and discussed at seminars	-introduction to information literacy, introduction to scientific publications, basic search technique, subject terms, library discovery tool, introduction to referencing, copyright
<b>Second year</b> Organization and leadership 7.5 HE credits	-search, collect, evaluate, and interpret critically relevant information from several different theoretical perspectives	a qualitative field study presented and defended at a seminar	-in-depth studies of scientific articles, more advanced introduction to search technique and searches in subject databases, referencing, copyright
<b>Third year</b> Bachelor's thesis in Business Administration, 15 HE credits	- research skills. -search, critically interpret and systematically analyse information and discuss complex phenomena, issues, and cases.	a scientific study, a bachelor's thesis, presented and defended at a seminar	-advanced search technique, advanced searches in databases, use of thesaurus, copyright, referencing

**A content analysis of bachelor's theses 2010 and 2019.** In total 34 bachelor's theses were analysed regarding documentation of search strategy, i.e., to demonstrate skills in searching, critically reflecting on and discussing high-quality sources such as peer-reviewed articles. The 17 bachelor theses from 2010 assessed by the Swedish Higher Education Authority were compared to 17 bachelor's theses from 2019 with the same distribution of grades as the original sample, i.e., nine theses graded passed and eight passed with distinction. The distribution of male and female students in the sample was approximately 50 percent in 2010 and 36 percent male and 64 percent female students in 2019. The analysed theses applied qualitative and/or quantitative methods and had a page range from 26–73 pages. As illustrated in Table 2 there is an obvious increase from 2010 to 2019 regarding students' documentations of structured searches and selection of articles in scientific databases as well as the number of scientific articles used in the theses ranging from 0 to 24 in 2010 and 13 to 46 in 2019. The rate of students passing the thesis course also shows an increase from 90 percent in 2010 to 98 percent in 2019.

Table 2.

*Overview content analysis*

	<b>Including a documentation of search strategy</b>	<b>No documentation of search strategy</b>	<b>No scientific articles</b>	<b>&lt;5 scientific articles</b>	<b>6–15 scientific articles</b>	<b>&gt;15 scientific articles</b>	<b>Passing rate for the thesis course</b>
<b>2010</b> 17 theses	7 (41%)	10 (59%)	6 (35%)	3	6	2	90% In total 69 students
<b>2019</b> 17 theses	14 (82%)	3 (18%)	-	-	4	13	98% In total 78 students

The results of the content analysis confirm earlier studies stressing the impact IL sessions may have on students’ learning outcomes (e.g., Atwong & Heichman Taylor, 2008; McInnis Bowers et al., 2009) Furthermore results show students’ use of high-quality information sources instead of lower-level Web search tactics mentioned by Civilcharran et al. (2015).

**Outcomes – perspectives on the application of the scientific wave.** The application of the Scientific Wave as well as the information literacy sessions have been evaluated in oral and written feedback from teachers, librarians, and students during 2013–2019. The feedback verifies that information literacy sessions have a positive impact on the students’ achievements and professional readiness.

**The teachers’ perspectives.** Teachers express their views of the value of collaboration with liaison librarians, co-designed sessions in the classroom, development over time and students’ insight into the process as well as challenges in keeping the Scientific Wave ‘alive’. The pedagogical and discipline-related benefits of collaboration give synergy effects for the whole bachelor’s program as illustrated in the quotes below:

The library staff should be an integrated part of the teaching. The library needs to be more visible or present, in every course and preferably early in the program. (Teacher 1, 2019)

This is a flexible way for libraries and faculty to collaborate to ensure that each course contributes and maintains the Scientific Wave. It is important for students to know that they are studying at a well-planned program where teachers work together with each other as well as with other parts of the university. (Teacher 3, 2019)

One advantage of the Scientific Wave is that I do not have to ask my students or colleagues what they have focused on in previous courses. (Teacher 4, 2019)

The teachers state that the library-faculty collaboration results in improved bachelor's theses in which students use high-quality sources and demonstrate abilities to search, critically reflect on and discuss their search strategies and that the students acknowledge the importance of the continuous sessions as parts of their thesis skills. Furthermore, teachers stressed that the Scientific Wave resulted in enhancing students' research skills, information literacy, academic writing and critical thinking related to current research in the field of business administration. This links to the research by Cunningham and Anderson (2005) and Rutledges and Maehler (2003), emphasizing the importance of information literacy related to business administration, i.e. business information literacy, students' critical thinking, research skills and decision-making during the education as well as after graduation.

Working together with a liaison librarian and building continuous relationships was much appreciated. The resources and comprehensive service provided by the library are highlighted in the following quotes:

It is valuable that we have one specific person with whom we can interact, as one entrance to the library – a contact that we have had for several years.... Also, the library offers a wide range of services, it is not only about these teaching sessions, but it is also about how the library develops its website, produces instructional films and material. (Teacher 2, 2019)

The teachers retrospectively view the application of the Scientific Wave from 2010 to 2019 and identify progressions in students' thesis works:

The Wave gives a structure and a combined knowledge platform since it is based on a matrix of course contents... Earlier it was extremely difficult for the students to see the difference between understanding what theory is and what one can have in a theoretical chapter of a thesis. Earlier students did very fragmented and unplanned searches and collections of material. (Teacher 2, 2019)

One challenge mentioned is whether the students really capture the essence of the Scientific Wave and that the need to communicate the framework is essential:

The Wave is now truly clear to us as teachers and for every course you must communicate that what we do is a part of the Scientific Wave linked to the general national learning outcomes! (Teacher 2, 2019)

Another issue not noticed in earlier research is the importance of internal legitimacy, here as keeping the knowledge of the Scientific Wave among faculty and that the university

acknowledge the collaboration and gives resources for continuous development:

It is important to bring in new employees early and discuss the essence of the Wave as a shared document! The Scientific Wave requires that each teacher takes responsibility for distinct parts of the program development and that collaboration with the library takes place on several occasions. (Teacher 3, 2019)

Another challenge recognized among teachers is to constantly keep the Scientific Wave vital and vibrant without an external pressure/threat:

I think the Wave may be of reduced importance today. I am not sure that we all are completely convinced of its importance and how we systematically should work with it ... some think that we have too many rules and instructions and that it affects the students' independence (Teacher 2, 2019)

It is a danger or a disadvantage if you do not update the Wave related to changes made in the courses. (Teacher 1, 2019)

The student theses are better today than in 2010, but I cannot say that they are better than 2017, and there we have a problem with keeping the Wave alive. In 2011–2012 we had tough external pressure which gave us high legitimacy to work with these issues. (Teacher 2, 2019)

**The library perspective.** The liaison librarian experiences an improvement regarding collaboration due to the Scientific Wave framework. The use of the framework entails that the teachers contact the library in suitable time and thereby give the librarian an opportunity for advance planning. Planning and regularity are keystones for distinct progression and coherence to avoid the ad hoc solutions described by Kvenild and Calkins (2011). Furthermore, students' reactions during IL sessions demonstrate an 'aha' experience when they realize that there is a larger context for application of IL skills throughout the program and beyond. This cohesion generates a higher level of student engagement and involvement during IL sessions.

Moreover, the collaboration has created internal ripple effects at the university which has had an impact on the planning of library-faculty collaboration for information literacy sessions in existing programs, as well as for future programs.

**The students' perspective.** Student evaluations from information literacy sessions have over the years been positive. The quotes below illustrate students' views during the bachelor's program.

I have never attended an information-seeking session before, but okay, you obviously could teach me some more things. (Undergraduate, 2014)

The good thing about this is in connection with our assignment. Otherwise, I would have thought it all was unnecessary! (Undergraduate, 2014)

Graduates who review their education retroactively one or two years after graduation describe their views of the Scientific Wave and the information literacy sessions as follows:

This, that you teach us new things on various levels is so good! It is so strange, though, you are so clear about the fact that every occasion is more in depth and yet not everyone gets that! (Former student 4 one year after graduation)

It was good not just as info sessions, but as a student you can apply the knowledge directly on something [assignment]. The positive thing is that I always felt support from the library which was necessary to cope with the progression of the bachelor's program ... students do not really know what kind of support the library offers. (Former student 1 two years after graduation)

The information we received from the library was great. Learning how to handle databases was especially useful. (Former student 5 one year after graduation)

As pointed out by Grizzle and Torras Calvo (2013) and Smith and Edwards (2012), there are aspects of lifelong learning related to this kind of library-faculty collaboration. This study referred to aspects of work-integrated learning. The former students state that they did not fully understand or appreciate the purpose of the Scientific Wave and the information literacy sessions until their third year working with the bachelor's thesis, during graduate studies or later when practicing the skills as new employees hence related to their professional skills and lifelong learning abilities.

Praise the Scientific Wave! It is so good; it gives a great deal of security in the bachelor's thesis which as a student one takes for granted that all other students at other universities also have access to. (Former student 3 two years after graduation)

I took my master's degree immediately after my bachelor's degree and during my further education I was grateful for the Scientific Wave. ... I noticed that the ability to search for and use information varied between my fellow students at master's level. However, I always felt confident in my information literacy skills. (Former student 2 two years after graduation)

I work in the banking sector and have not previously reflected so much on what I received from the Scientific Wave. What I benefit from is the knowledge about how to express yourself academically and correctly in both speech and writing, which is important in my work. ... I also really do benefit from what we practiced when it comes to finding and critically reviewing relevant information. (Former student 4 one year after graduation)

In the business world I have benefited from going through extensive texts and knowing ways to search for various kinds of information and critically evaluate sources. (Former student 2 two years after graduation)

According to former students there are several ways to improve the Scientific Wave, such as to continuously inform students how the Scientific Wave is integrated in the course syllabus, and to further increase the interaction and collaboration between teachers and librarians to give students the same information and examination criteria.

## **Conclusions**

As shown in earlier research there are several advantages for inter-professional library-faculty collaboration in higher education especially within the field of business administration (see Atwong & Heichman Taylor, 2008; Houlihan et al., 2020; McInnis Bowers et al., 2009; Smith & Edwards, 2012, Wu & Lee Kendall, 2006). This longitudinal case study contributes an illustration of how to build a successful library-faculty collaboration with focus on information literacy throughout a bachelor's program and furthermore the outcomes of such a collaboration from the perspectives of faculty, library and students in a Swedish context.

The process at University West was initiated by an external national evaluation process, which thus generated a “forced” and comprehensive quality-enhancing process based on a library-faculty partnership. The framework of the Scientific Wave including information literacy sessions has been fully applied with gradual refinements within the business administration bachelor's program since 2013.

Based on earlier research and the findings presented in this longitudinal case study the following guiding principles are argued to be crucial in institutionalizing a successful library-faculty collaboration:

- 1) to apply a step-by-step process to identify the benefits of library-faculty collaboration, integrate and continuously anchor the process among staff and management
- 2) to assign liaison librarians to build trust and closer relationships with faculty within a specific discipline to support education as well as research
- 3) to map and illustrate the collaborative learning outcomes integrated to course curricula, assignments and assessments throughout courses and programs in a shared framework
- 4) to co-design structures and progression for co-teaching of the information literacy sessions
- 5) to continuously communicate the essence of the library-faculty collaboration to students and teachers related to education, professional life, and lifelong learning
- 6) to dedicate time and resources to keep the library-faculty collaboration updated, vital and vibrant

Findings show that the Scientific Wave has had impact on the overview of the progression

of IL within the program for students, library, and faculty; the overall quality of students' research skills including information literacy is shown in Table 2. The content analysis of student theses clearly shows that the students' skills in information literacy have been improved since 2010 as students in 2019 used high-quality information sources and advanced search strategies demonstrating skills in conducting thorough searches and documenting the search process in a transparent way. The quality improvements show specifically a distinct difference in students' documentation of search strategies and use of scientific articles. There are pedagogical outcomes emphasizing the program and progression of students' skills throughout courses. As recognised by students, the Scientific Wave and skills in information literacy are also important in professional life affecting their lifelong learning beyond graduation.

The Scientific Wave is dynamic and can be further developed and improved. Lessons learned from this process show that challenges appear despite a shared framework, e.g., the collaboration still is person-dependent which may result in lack of continuity and progression due to staff turnover. There are still some difficulties to encourage faculty about the pedagogic potential of information literacy and that information literacy strengthens the scientific working process. Some teachers are unable to envision the positive synergy effects of institutionalized information literacy sessions. Another hurdle might be students' tendencies to overrate their abilities in this area, showing a constant need to disseminate and communicate the ideas and progression of the framework towards students and teachers. Revisions are also needed in order to keep the Scientific Wave and the library-faculty collaboration vibrant and dynamic.

The present study contributes by responding to calls for further research to deepen the insight into information literacy and library-faculty collaboration in higher education within the field of business administration. Findings show its impacts on students' search strategies, research skills and learning during education as well as beyond graduation. Thus, the Scientific Wave framework and particularly the students' information literacy skills as viewed as essential aspects of work-integrated learning as it combines theory and practice for professional readiness.

This study is longitudinal and include multiple perspectives yet there are limitations such as small samples of studied bachelor's theses, former students' surveys, and faculty interviews. Retrospective studies covering several years may also include lapses of memory. Furthermore, other quality measures conducted within higher education and the studied bachelor's program as well as corresponding quality measures performed in other parts of the education system, e.g., high school education during the same period of time, may have affected the results. To disseminate library-faculty collaboration such as the framework of the Scientific Wave, we suggest future research to continue to explore the full range of library-faculty collaboration to embed and integrate information literacy in higher education. Future research is much encouraged to be performed jointly by faculty and librarians.

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