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EDITED BY

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REVIEWED BY

Valentine Ukachukwu Okwara,
University of the Free State, South Africa
Sam Illingworth,
Edinburgh Napier University, United Kingdom

*CORRESPONDENCE

Akiko Mori
✉ mori@dir.rcast.u-tokyo.ac.jp

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A case study of education outreach coordinators in universities in Australia and New Zealand

Akiko Mori*

Advanced Education Outreach lab, Research Center for Advanced Science and Technology, The University of Tokyo, Tokyo, Japan

Introduction: The significance of STEM outreach in high school–university collaboration is well recognized; however, its ecosystem remains underdeveloped. Despite the criticality of Educational Outreach Coordinators (EOCs) in facilitating sustainable partnerships, their role in high school–university collaboration is underexplored. This study focuses on Queensland, Australia, and the North Island of New Zealand to explore the roles of coordinators who belong to universities.

Method: Semi-structured interviews were conducted at four universities in February 2024. The results of four interviews involving 10 participants in total were used to determine the positions and roles of coordinators at universities in charge of educational outreach to high schools, as well as their skills.

Results: At the universities surveyed, professional coordinators were employed for educational outreach to high schools. The thematic analysis suggested that coordinators are proactively and centrally involved in various processes, such as relationship building, project development, oversight, evaluation, and personnel development. They contribute significantly to the success of these projects through strategic and autonomous management.

Discussion: The actual activities of coordinators of high school–university collaboration as university professionals have not been clarified in previous studies. Examples from the surveyed universities suggest that throughout high school–university collaboration, coordinators, in addition to teachers and learners, hold influence and play a vital role in the educational scene. Despite sample limitations, the findings provide a foundation for further exploration and institutional recognition of EOCs globally.

KEYWORDS

qualitative research, STEAM education, school–university collaboration, coordinator, third space professionals, Queensland, New Zealand, Japan

1 Introduction

A large corpus of literature confirms the significance of educational activities that involve collaboration between high schools and universities. Olitsky et al. (2020), for example, reported that a newly developed science course, created through collaboration between high schools and universities, yielded significant benefits for both university and high school students. Sinclair and Marshall (2009) highlighted that, in an atmospheric science project, high school students contributed to university research by collecting data, which enabled

researchers to obtain high-quality datasets while the high school students gained valuable data collection and analysis skills. University-led programs, such as Space School UK, NetSci High, and PRiSE, have been especially successful in engaging high school students by providing hands-on research experiences in STEM fields. These initiatives enhance students' career clarity, confidence, and interest in pursuing STEM education, while fostering connections between secondary and higher education (Robson et al., 2020; Cramer et al., 2015; Archer and DeWitt, 2020).

Some aspects of high school–university collaboration can be interpreted within the context of the STEM outreach concept. Tillinghast et al. (2020) defined STEM outreach as “the act of delivering STEM content outside of the traditional student/teacher relationship to STEM stakeholders (students, parents, teachers...) in order to support and increase the understanding, awareness, and interest in STEM disciplines.” STEM outreach functions as a system where diverse stakeholders collaborate and its effective operation requires a comprehensive understanding of these interactions (Appel et al., 2020). However, the advancement of the STEM ecosystem is still in the developmental stage (Tillinghast et al., 2020).

Beyond the educational sectors, insufficient collaboration among stakeholders in the ecosystem reduces its sustainability (Fobbe, 2020; MacDonald et al., 2022). Sultana and Turkina (2023) highlighted that intermediaries or coordinators play a pivotal role in the sustainable development of ecosystems by facilitating collaboration and supporting the diffusion and implementation of innovation. Thus, in the context of corporate ecosystems, studies have recognized the role of intermediaries in maintaining effective collaboration and enhancing overall functionality. However, in educational fields, such as STEM outreach or high school–university collaboration, the role of coordinators remains underexplored and largely invisible. Indeed, various conflicts exist among stakeholders in high school–university collaborations, requiring the necessity of an Education Outreach Coordinator (EOC) as a key element of such a mechanism (Mori, 2024). By visualizing their roles, this research contributes to the development of more effective and sustainable high school–university collaboration, including STEM outreach.

An initial literature review identified prior research addressing the role of coordinators in research education at Australian universities (Boud et al., 2014). Looking broadly at the professional role of outreach coordinators in universities, outreach coordinators have played a central role at university library reference desks by investigating the reasons for underutilization, proposing strategic solutions, leading teams, and implementing solutions (Alburo and Brant, 2021). However, studies specifically examining coordinators engaging in high school–university collaboration were not observed. Hendrickson et al. (2020) suggested that outreach coordinators were an important part of the team in a science outreach program for K–12 students at a US university; however, they could not grasp the coordinator's overall activities or the details of specific roles.

While expanding the research to include a greater number of regions and countries would be valuable, this study limited its scope in the first phase to Queensland, Australia, and the North Island of New Zealand. This decision was primarily due to resource constraints, including the fact that the research was conducted solely by the author, with limitations of timeframe and budget.

Australia was involved in an international project, the Assessment and Teaching of 21st-Century Skills Project (ATC21S), launched at the

Learning and Technology World Forum in January 2009 (Miyake et al., 2014). This project, in addition to actively incorporating inquiry-based learning, has introduced inquiry-based learning approaches to STEM education (Kidman, 2012; Murphy et al., 2019).

Regarding high school–university collaboration, Australia has been promoting sustained partnerships between universities and high schools as a policy initiative since 2010 and prior research on such initiatives in Queensland has claimed some success (Zacharias and Mitchell, 2020). Other studies have discussed the status and challenges of university-led STEM outreach programs to address declining college enrollment (Sadler et al., 2018), suggesting that, overall, outreach to high schools is widespread. In addition, Queensland was selected as a representative region of Australia for this survey because of the author's prior experience in working with universities in the region, and because the author's research institute has a partnership agreement with universities in the state.

New Zealand is known as a typical example of New Public Management, having undertaken a radical education system reform called “Tomorrow's School” in 1989 (Nakamura, 2016). Consequently, schools have been given significant discretionary authority, allowing them to freely implement their initiatives (Sheerin, 2008; Annan, 2019). Additionally, regarding “starting from early childhood education, through the higher education level, to the business sector and its training programs, in a ‘seamless manner’” (Novlan, 1998), the importance of partnerships outside of school for 21st-century learning experiences is recognized, including partnerships with university research centers (Bolstad et al., 2012). Prior research has investigated program effectiveness through high school–university partnerships (Bay et al., 2017). In light of these findings, there may be interesting progressive cases in the interactions between universities and schools.

Australia and New Zealand have the same academic calendar and are “enthusiastic about improving schools in response to changes in the times and the needs of the community and children” (Sato et al., 2021). Therefore, it was possible to conduct the surveys simultaneously and analyze the results together.

In the author's previous role, she has visited both Queensland and New Zealand several times, engaging with local high schools and universities. During these visits, the author observed that universities in both countries were actively involved in university–high school collaboration. From a pragmatic perspective, the author had existing networks in these countries and regions, which allowed for the possibility of conducting interviews.

The term “outreach” is generally defined as 1. the act of reaching out, 2. the extent or limit of reach, 3. the extending of services or assistance beyond current or usual limits (Merriam-Webster Dictionary). The third definition is used across diverse fields, such as social welfare, arts and culture, libraries, and education. However, its usage varies between disciplines and even within a specific field. This is partly due to the context-dependent nature of outreach activities (Andersson, 2013). In the context of education, Tillinghast et al. (2020) provided a practical definition of STEM outreach based on their literature review, as the author described above. In university activities, the term “engagement” is often used synonymously with “outreach.” Oaks et al. (2009), for example, use both terms interchangeably and interpret them as referring to “the collaboration between higher education institutions and their larger communities for the mutually beneficial exchange of knowledge and resources.”

Building on these previous studies, this paper broadly uses the term “outreach” to describe activities conducted by universities for school-aged children, which are not solely aimed at student recruitment. Regarding the applicability of a similar concept to the Oceanic universities targeted in this study, Tillinghast et al. (2020) focused on international journals that accept submissions from around the world, including Oceania. Furthermore, Reed et al. (2021) examined the outcomes of a decade-long STEM outreach initiative conducted by Australian universities and corporations, and did not identify a distinct definition of outreach that diverges significantly from the aforementioned concepts. Therefore, the same conceptual framework for outreach is adopted in this paper, including its application to the context of universities in Oceania.

The remaining paper is organized as follows. Section 2 details the research methodology. Section 3 presents the results of the thematic analysis of the semi-structured interviews. Section 4 discusses the study’s limitations and future research directions.

2 Methods

2.1 Research design

In this report, the author often uses the term “high school–university collaboration,” however, the scope of high school–university collaboration includes all initiatives based on formal and ongoing partnerships (e.g., partnership agreements and university-affiliated schools), as well as one-off collaborative initiatives with no formal relationship. Additionally, the following are included in the scope of analysis: projects sponsored by universities, in which students participate individually, but which may be announced and recruited through schools. Furthermore, activities described as “school engagement or education outreach at universities” are broadly

included. Conversely, activities held solely for recruitment or marketing purposes, such as university information sessions aimed at attracting applicants or new enrollees, are not included in the scope of analysis.

Coordinators connecting high schools and universities can belong to high schools, universities, third-party organizations, or be independent. However, the coordinators analyzed in this study belong to universities. Additionally, this study will include all professional personnel who belong to departments related to high school engagement and are engaged in coordination-related work, even if they are not necessarily titled as “coordinators.”

This study conducted analysis using interviews involving 10 interviewees labeled a to j, across four groups from four universities, labeled A to D, where the coordinators of the universities were included among the interviewees and were able to explain their specific roles (Table 1).

Interviews were conducted with the participants’ informed consent and in accordance with guidelines that set forth the purpose and structure of the interviews, as well as pledges regarding the collection, use, and storage of data. The research plan was approved by the Expert Committee on Ethical Review of the University of Tokyo (Review No. 23–212).

2.2 Data collection

Data was collected through four interview sessions at four universities in Queensland, Australia, and the North Island of New Zealand, from February 16 to 27, 2024. Participants included personnel equivalent to EOCs, university faculty members, administrative staff, and high school teachers involved in high school–university collaboration. The selection of participants followed a purposive sampling strategy, focusing on individuals engaged in

TABLE 1 Attributes of qualitative study participants.

University	Date of interview	Number of interviewees	Participant (Interviewee)	Position/Attribute
A	Friday, February 16, 2024	1	a	A professional in the role of coordinator belonging to university A. Leads the school and community engagement team, which is responsible for high school and university connectivity and collaboration across the university.
B	Tuesday, February 20, 2024	4	b	A professional in the role of coordinator belonging to university B. Manager in charge of high school–university collaboration under the direct supervision of the vice president.
			c	The vice principal of the secondary school (hereinafter referred to as “school Y”), supported by the coordinator in B.
			d	Dean of Science (teacher) of school Y
			e	Teachers of school Y
C	Friday, February 23, 2024	3	f	A professional in the role of coordinator belonging to university C.
			g	University faculty members
			h	University staff in charge of municipal cooperation
D	Tuesday, February 27, 2024	2	i	A professional in the role of coordinator belonging to university D
			j	A professional in the role of coordinator belonging to university D

organizational-level initiatives rather than efforts tied to individual researchers or specific research groups. The primary aim was to explore systematic approaches by universities toward high school–university collaboration or high-school outreach and the roles of personnel equivalent to EOCs within universities. The study focused on identifying key practices, challenges, and contributions of EOCs within these contexts. The interviewees were selected using the following sampling: (1) the author directly searched for and made appointments with the interviewees, (2) the author searched for specific targets but asked for a liaison to the introducer when it was difficult to make a direct appointment, and (3) the purpose of the survey was explained to the introducer, who searched for the appropriate subjects and made an appointment with them.

A total of 10 participants were interviewed across four sessions, with each session lasting between 50 to 80 min. Interviews were conducted in either individual or small group settings, depending on participant availability and preferences. A semi-structured interview format was used to maintain consistency in addressing key topics while allowing flexibility to explore unique perspectives. At the beginning of the interview, the author provided a brief self-introduction, explained the purpose of the interview, and outlined items corresponding to the guidelines. Participants were then invited to share their opinions on topics such as the specific objectives and content of outreach or engagement activities targeting high schools or high school students, the roles played by coordinators in these activities, and any challenges encountered. The variation in interview lengths is attributed to the semi-structured format, which allowed for differences in the amount of speech provided by the interviewees. While the sample size was limited due to logistical constraints and the exploratory nature of the study, the diversity of the institutions and participants provided valuable insights. Thematic saturation may not have been fully achieved, as additional interviews might have revealed further nuances. However, the data collected allowed for the identification of initial patterns and themes relevant to the study's objectives.

Regarding ethical considerations, written consent was obtained when the author directly contacted the participants and conducted interviews in person. This approach allowed for a more formal consent process and reflected the author's intent to ensure thorough documentation where feasible. However, in cases where the liaison personnel facilitated the interviews or where logistical constraints, such as remote settings, were involved, verbal consent was secured. This alternative approach prioritized the establishment of trust, respected the preferences of the liaison personnel to maintain positive relationships, and minimized the burden on the participants to encourage their cooperation. All interviews were audio-recorded with the participants' consent and transcribed verbatim. The author followed the principles of the Consolidated Criteria for Reporting Qualitative Research (COREQ; Tong et al., 2007).

2.3 Data analysis

This study employed Reflective Thematic Analysis (RTA), as defined by Braun and Clarke (2019, 2021), following its six phases: (1) familiarizing with the dataset, (2) coding, (3) generating initial themes, (4) developing and reviewing themes, (5) refining, defining,

and naming themes, and (6) writing. RTA was selected for its emphasis on the researcher's subjective insights, which align with the study's goal of identifying the roles of EOCs within the study's context. The six phases of RTA provided a structured yet flexible framework for analyzing qualitative data.

The analysis began with a thorough review of the dataset—transcription of all interview recordings. Using inductive open coding, initial codes were generated for segments potentially related to the research questions. Subsequently, the coded data were examined to identify similarities and overlapping areas between codes, which led to the generation of initial themes. The generation of themes was guided by the perspective of project management processes, focusing on the involvement of EOCs across various phases of a project—from initiation to closure. This approach was chosen to illuminate the roles of EOCs by examining their contributions at each stage of the project lifecycle. By adopting this process-oriented framework, the study aimed to provide a nuanced understanding of the professional roles and specific actions undertaken by EOCs. The project management perspective, as outlined in frameworks by the *Project Management Body of Knowledge*® (sixth and seventh editions; Project Management Institute, 2017, 2021), provided a structured lens to analyze the systematic and strategic contributions of EOCs in high school–university collaboration initiatives.

To organize and refine themes, codes and data were categorized into tables on separate sheets corresponding to each emerging theme. Each theme was iteratively refined by cross-referencing coded data, the dataset as a whole, and the emerging themes. A thematic map was created to visually represent the relationships between themes and ensure that the analysis captured the overarching narrative of the research. Particular attention was given to maintaining consistency between the themes and the study's focus on understanding the roles of EOCs in high school–university collaborations. Finally, the themes were polished and named. The final report was produced by weaving the analyzed themes with supporting data to illustrate the multifaceted contributions of EOCs to high school–university collaborations and outreach.

In this series of surveys, the interviews were divided into individual and group interviews, depending on the intention of the interviewees. Individual interviews allow interviewees to freely express their personal experiences and opinions without being influenced by others. Conversely, group interviews are expected to generate new perspectives and insights as participants are influenced and stimulated by the comments of others. Although individual and group interviews differ in these characteristics, in this study, emphasis was placed on the fact-finding aspect, rather than on the psychological aspect, and was not deemed to be a major impediment to the reliability of analyzing individual and group interviews together.

3 Results

All four universities were involved in high school education and high school–university collaboration. Although the content and extent of these efforts varied from one university to another, they included university courses for credits, STEM education in university laboratories, contests for high school students, intensive programs on academic research, individual matching of

high-achieving high school students with researchers, development of online learning materials, curriculum development at partner high schools, conferences between partner high schools and universities, campus tours by university student ambassadors, and language support. Additionally, the following activities were mentioned: sending university students to schools as university ambassadors, training for school teachers, and networking events for school teachers. Alongside the cooperation of a diverse range of university faculty members, hundreds of university students were active in these activities at universities A through C.

Moreover, regarding the high school–university collaboration, the author was able to confirm the presence of a professional in the coordinator role in all the universities surveyed. The backgrounds of the coordinators varied, including those with doctoral or master's degrees, former school teachers, and those with experience in strategic planning. The contents of the high school–university collaboration activities assessed here include only those in which the coordinator of the interviewee was involved. It should be noted that more diverse efforts must be made by the university as a whole. The following presents the themes developed for the roles of EOCs and their details.

3.1 Building relationships

Personnel in the coordinator role were observed building relationships with stakeholders. The following are examples of departments with more than one person in the coordinator role:

Our highest achievers, our brightest young minds; not due to capability, but due to access. So, our highest achievers are often set in this space, and we have got a manager who is tasked with really making sure we are building good relationships with these specific schools...So the manager in this space is aimed at building better relationships with our highest achievers (A, a).

The coordinators considered the current issues and the direction to take and then identified and approached the key players in the situation. Networking was one of their key activities. They approach school teachers, principals, and academics proactively and form a rapport.

In addition to organizing events and strengthening the relationship between coordinators and schools, there were examples of promoting interaction among multiple schools. Opportunities for school teachers to interact with each other are not always abundant; however, opportunities to learn from each other are important. It is also crucial for university coordinators to function as platformers by planning events and creating opportunities for school teachers to get to know one another:

In November, we had about 60 online and 30–50 in the room. Yeah, they really love it because it's also networking for them. It's a professional development day for the teachers so they can get together and they can work with each other (D, j).

This role and related activities of EOCs are essential for building and expanding the ecosystem of high school–university collaboration while fostering active communication among stakeholders.

3.2 Project development

The coordinator is the driving force in planning specific practices and coordinating with stakeholders to develop them. A distinctive feature is that, in developing programs, EOCs autonomously foresee the direction while advancing initiatives not by leading as sole figures but by actively engaging a wide range of stakeholders:

So that's how we kind of started; we had an idea of how we wanted the program to be shaped and then we brought our core group of teachers in to help us build that program. Then they were our champions within the school community to promote what we were doing to other schools and also help us streamline what we were offering. We had the teachers give us this is everything that we would like you to do in the next two or three years but then we focused on what can we achieve within this time and the funding expenditure for the resources and staffing as well and then we worked from there to build some core experiences that we deliver and then you worked out how often we could actually deliver them (C, f).

All requests from the schools come in through me. And then I can follow the right channels at B and go and ask the faculty or the head of school, all the particular academic, and manage that to and fro to make sure that we are not overreaching (B, b).

After hearing the needs of the stakeholders, the coordinators considered the feasibility of the project, taking into account various perspectives, such as budget and human resources. The method of developing a program by involving school teachers, researchers, and others, rather than by creating the program alone, differs from the usual approach of lesson development by university faculty members. Collaborative development is the key element of approaches by EOCs:

We do utilize our academics or our researchers to help us create the content that might go into the activity (C, f).

3.3 Project supervision

Project supervision may be one of the most critical roles of EOCs. When multiple stakeholders are involved or the initiative extends over a long period, it can be challenging for the presenting faculty members alone to effectively manage the progress, maintain a comprehensive understanding of the project, make necessary adjustments, address delays, and respond to unexpected events. EOCs excel in managing from a broad, strategic perspective, rather than engaging in micromanagement, making them uniquely suited to oversee and steer projects effectively:

We have oversight of that relationship and all sorts of bigger-picture decisions about which programs are the priority (B, b).

We get to know which of our faculty members are good speakers, really engaging with the students. We call on them a lot to do things for us (D, j).

In the management of projects and programs, coordinators rarely take the front seat. Except in cases where they are forced to step in as a

substitute, they often ask university faculty or students to take the stage while they provide support in the background. However, the coordinator is not necessarily a supporting role; he/she manages the entire project from behind the scenes, overseeing the program, managing its progress, and correcting course as circumstances dictate:

They do not need to deliver everything. They can bring in the academics to be a core part of the delivery of a program. But they are the leads. They coordinate, develop, and oversee the delivery of faculty programs (A, a).

They (professionals) are running the program, but the actual program is delivered by the undergraduate students who are doing the actual teaching of the workshops (C, f).

The ability to maintain such a broad, strategic perspective may be significantly influenced by the way EOCs are positioned within the organizational structure. In several cases, EOCs were found to hold dual appointments between individual faculties and the university headquarters, or to report directly to the university headquarters:

They work closely with the faculty network, and closely with their academics, to develop faculty-specific experiences, because everyone reports, and, to me, they still exist in the central administration of the university, but they are physically based in the faculty (A, a).

We have specific faculties or divisions. So for me and j, we work under the D-X, so the Commerce Faculty. And I work for the Law Faculty as well, across the road (D, i).

The coordinator takes charge of program contents, implementation timing, and selection of speakers. However, they do not make decisions unilaterally based on their judgment, but rather communicate closely with superiors, colleagues, and other stakeholders, reporting back to them and confirming their impressions of the program as they handle the broader perspective.

3.4 Project evaluation

The coordinator tracks the progress and outcomes of the project and attempts to collect and analyze data:

We're two years old, so we are in the process of capturing that year-on-year reviews, implementing, and reviewing. It's lots of fun, but it's very difficult. (...) So we have targeted resources to evaluate our programs, and what that means is developing surveys, getting quantitative data, and qualitative stories from our youth participants, and our students, and our teachers (A, a).

Without someone to compile and analyze the initiatives, the project ends up being implemented, and it is difficult to visualize and share the contents and results of the initiatives. Thus, it is difficult to create a sense of empathy, solidarity, and satisfaction between the high school and university faculty, which may lead to chaotic efforts and a sense of frustration. The coordinator's evaluation, as well as supervision of the project, could contribute to enhancing the trust relationship between high schools and universities:

There was a lot of almost tension underlying and it just wasn't coordinated or reported on or tracked. So the current Vice Chancellor put up some funding for the position that I sit in (B, b).

Tracking and analyzing the outcomes of the initiatives is crucial for developing strategic approaches. University faculty members are likely to analyze and evaluate their educational practices involving high school students when conducting them as part of their own research activities. However, when these activities are part of an organizational effort or undertaken as a form of social contribution, they are less likely to be followed up extensively. As a result, initiatives may end without a clear understanding of whether their goals and objectives were achieved or unintended experiences were brought to the students.

Moreover, clarifying the outcomes of the initiatives can serve as a motivation for stakeholders, including university faculty and school teachers. Evaluating and reporting on the results is essential for fostering an effective ecosystem and sustaining engagement. Given their involvement across all phases of a project, EOCs are uniquely positioned to act as evaluators and reporters. To fulfill this role, they are strongly encouraged to develop the skills necessary to investigate and analyze the content and outcomes of the initiatives.

3.5 Human resource development

The coordinator will provide training opportunities for team members and may provide training for university faculty, university students, and others who will serve as lecturers and mentors on the project. Providing training activities, such as mock sessions, in addition to simple on-the-job training, is crucial for quality control:

We do a lot of professional development at a manager level. (...) We do quite a lot of leadership development, and that's just through business coaching. Individualized business coaches, beyond me as their manager, are someone to sit with and really talk about their skill set and readiness at an advisor level. We do systems and process training (A, a).

We can also offer training, as we have been doing quite a bit lately; offer training for university staff and tutors on how to work with junior secondary students, how they are different, why they are different, what this concept of neurodiversity is, and how they can do simple things to help in the laboratory or the classroom environment (B, b).

They do a training session, they will actually do a workshop with a more experienced student ambassador who has taught that workshop before. So they get that training and then they will not be left on their own to deliver the workshop until we are comfortable with what they know. They're an expert in the workshop and the quality is present as well (C, f).

These observations highlight the necessity of two perspectives in personnel development. The first pertains to the skills of the coordinator, and the second to the skills required for guiding high school students. While it is not essential for a single EOC to cover

both aspects, experienced university students may train their juniors in student-focused training. However, when considering EOCs collectively, it is expected that both perspectives are addressed.

Additionally, there were cases where outreach activities included programs equivalent to professional development for school teachers. It is not always necessary for EOCs to develop training content themselves; this can be entrusted to experts or experienced practitioners. However, EOCs must be able to assess what training should be conducted and whether the content is effective. To fulfill this role, EOCs are expected to possess a certain level of knowledge about project management and school education.

3.6 Strategic and autonomous management

All of the coordinators interviewed for this study were seen to engage actively and take a leading role in their work. They communicated with a diverse range of partners, including school principals, school teachers, university faculty at the dean and president level, various researchers, and university students, among others. What stood out in these interviews was that all the professionals equivalent to EOCs demonstrated a high level of autonomy in their work. This was most succinctly captured in the following statement:

Not being micromanaged and having the leeway to be able to make calls on what I need to do are important to me (D, j).

Additionally, expressions such as “lead” the project and “oversight” highlighted that they perceive their roles as those of driving and managing projects, instead of passive or purely supportive. This reflects their strong sense of responsibility and active engagement in their work. They were given a certain degree of discretion and authority to make decisions. The results suggest that this leads to a sense of satisfaction and pride as professionals.

It was suggested that this is inextricably linked to the high skill level required of coordinators. Furthermore, coordinators were able to draw on their work experience and academic background. Additionally, all coordinators were found to have high communication skills:

If we took someone who was indeed a faculty expert, whether they (professionals) would be more successful, maybe yes, maybe no. Of course, being an expert is not enough. They also have to have great engagement and be good at relationships. Really. High talent when it comes to communication (A, a).

Analyzing these roles in terms of the project process (Initiating, Planning, Executing, Monitoring and Controlling, and Closing; [Project Management Institute, 2017, 2021](#)), the author was able to capture the involvement of the coordinator in every process of the project ([Figure 1](#)).

Official partnerships, such as a memorandum of understanding, can serve as facilitators in promoting collaboration between high schools and universities. However, some comments suggested that, even when there is a memorandum or an agreement, laying the groundwork for mutual cooperation, the cooperation may not be successful without the involvement of a coordinator belonging to the university:

In previous experiences of the university, what they found was that, from schools, teachers in a lot of places would reach out to different academics all across the university saying, “Can we have help with this? Can we do some STEM inquiry? Can we do some language learning?” And if that individual academic could not deliver, the request would die. Some academics felt obliged to deliver but did not have the training and capacity (B, b).

By being involved in the entire project process and carrying out the work strategically and autonomously, EOCs serve as the driving force behind initiatives.

4 Discussion

This study provides significant insights into the roles and contributions of EOCs in high school–university collaborations, highlighting their importance as the driving force behind these initiatives. EOCs engage across all stages of project processes, including relationship-building, project development, supervision, evaluation, and human resource development, contributing to the

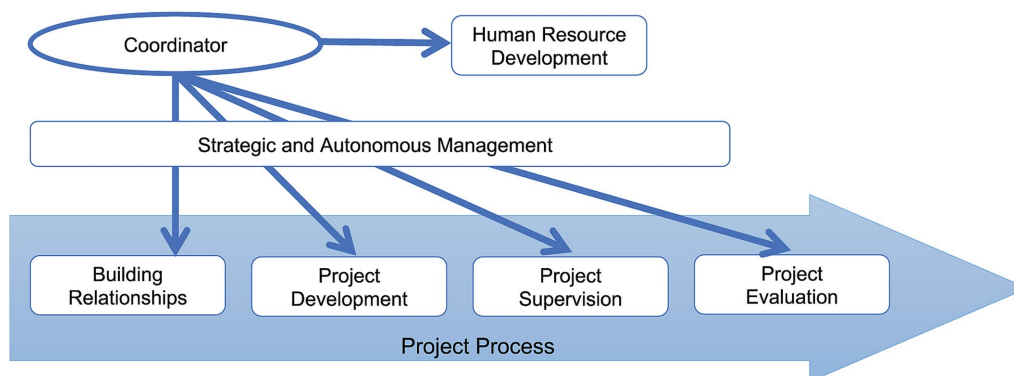


FIGURE 1
Role of coordinators at the universities surveyed.

sustainability and innovative potential of the ecosystem of high school–university collaboration.

Similar to how intermediaries play pivotal roles across iterative processes in ecosystems outside the field of education (Sultana and Turkina, 2023), this study highlights the significant role of coordinators in high school–university collaborations and institutional outreach initiatives. This research has successfully visualized, to a certain extent, the previously underexplored roles of EOCs. The study expands on these frameworks by offering an in-depth examination of the multifaceted roles of coordinators, particularly in educational contexts, and by emphasizing their capacity to navigate complex stakeholder dynamics and implement strategic, sustainable approaches to collaboration. Recognizing the importance of EOCs in high school–university collaborations and STEM outreach is expected to lead to the establishment and appreciation of similar positions across universities and ecosystems, thereby fostering further development of these collaborative frameworks.

The findings reveal the broader implications of EOC activities for fostering STEM outreach ecosystems. While high school–university collaborations often overlap with STEM outreach initiatives, this research highlights their shared focus on creating reciprocal benefits for schools and universities, as well as their alignment with institutional goals for educational impact. By visualizing the roles of EOCs and situating their contributions within this dual context, the study provides a foundation for enhancing both high school–university collaboration and STEM outreach ecosystems. Moreover, the results suggest that formal recognition and institutional support for EOCs could significantly strengthen these ecosystems, particularly through strategic alignment with policies and frameworks that prioritize the development of inquiry-based and STEAM education.

Although this study focuses on cases from Australia and New Zealand, its implications extend to other contexts, including Japan, where high school–university collaboration is gaining momentum, particularly in inquiry-based learning and STEAM education. In Japan, systemic mechanisms to foster sustainable collaborations remain underdeveloped and this research underscores the potential of EOCs to address these challenges. By serving as intermediaries who drive school–university collaboration, EOCs can ensure that collaborative efforts are effectively implemented, sustained, and evaluated, contributing to the broader goal of enhancing educational innovation.

Despite its contributions, the study acknowledges certain limitations. The sample size of 10 participants from four universities in Australia and New Zealand demonstrates a degree of diversity; however, it may not fully capture the range of practices and challenges experienced by EOCs or the broader context of high school–university collaborations and institutional outreach across different institutions. Thematic saturation may not have been entirely achieved and additional interviews could potentially reveal further nuances and insights. Therefore, it is important to acknowledge that the findings are not exhaustive in representing the roles and practices of EOCs, particularly when considering geographical breadth and sample size limitations.

However, as an exploratory study, the primary aim was to provide a foundation for understanding EOC's roles and generate hypotheses for future research. Additionally, the study focused on organizational-level initiatives, which excluded perspectives from

individual researchers or small-scale projects. While this allowed for a deeper exploration of systematic approaches, it may have limited insights into the broader spectrum of high school–university collaborations. Future research should address these limitations by including larger and more diverse samples and exploring a wider range of institutional contexts, which would enhance the generalizability of findings and provide a more comprehensive understanding of the EOC's role.

In conclusion, the study highlights the critical importance of EOCs in ensuring the sustainability and scalability of high school–university collaboration. Furthermore, the leadership approach taken by EOCs does not aim to position them above the stakeholders but rather emphasizes collaboration and the delegation of authority as appropriate to drive initiatives forward. This approach aligns with aspects of distributed leadership (Boud et al., 2014), which underscores the importance of shared responsibilities and cooperative engagement in achieving organizational goals. By acting as a driving force that facilitates collaboration among stakeholders, EOCs enhance the functionality and sustainability of educational ecosystems. The findings provide a valuable framework for future research and practical implementation to strengthen the role of EOCs, offering pathways for developing effective and sustainable collaboration mechanisms globally. Simultaneously, the results emphasize the need for policies and institutional efforts to formally recognize and support EOC roles, ensuring their integration into educational strategies and organizational structures to maximize their contributions to innovation and sustainability.

Data availability statement

The datasets presented in this article are not readily available because the original contributions presented in the study are included in the article material, further inquiries can be directed to the corresponding author. Requests to access the datasets should be directed to Akiko Mori, mori@dir.rcast.u-tokyo.ac.jp.

Ethics statement

The studies involving humans were approved by the Expert Committee on Ethical Review of the University of Tokyo. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required from the participants or the participants' legal guardians/next of kin because in some cases, interviews were arranged through a referrer, making it impossible to obtain written consent. Therefore, verbal consent was acquired at the time of the interview. For interviews directly requested by the author, written informed consent was obtained.

Author contributions

AM: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration,

Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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