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Training the trainer to embed IL into curricula: Results from an action research project

Michael Flierl, Visiting Assistant Professor and Information Literacy and Research Engagement Librarian, The Ohio State University. Email: flierl.1@osu.edu

Rachel Fundator, Information Literacy Instructional Designer, Purdue University. Email: rfundato@purdue.edu

Jason B. Reed, Assistant Professor of Library Science and Health Sciences Information Specialist, Purdue University. Email: reed252@purdue.edu

Bethany McGowan, Assistant Professor of Library Science and Health Sciences Information Specialist, Purdue University. Email: bmcgowa@purdue.edu Twitter: @bethany_mcgowan

Chao Cai, Assistant Professor and Plant Sciences Information Specialist, Purdue University. Email: caic@purdue.edu

Clarence Maybee, Associate Professor and Information Literacy Specialist, Purdue University. Email: cmaybee@perdue.edu Twitter: @cmaybee

Abstract

Academic libraries have long recognised the benefits of integrating information literacy into disciplinary curricula. One model that addresses the common problems of sustainability and scalability of such efforts is the train the trainer model, where academic librarians serve as faculty developers. Improving faculty development efforts requires understanding the methods and strategies of librarians engaged in this work. Using an action research methodology, this paper investigated the experiences of librarians and disciplinary instructors participating in a course redesign program at a large, public university in the midwestern United States, in order to identify effective strategies for engaging with disciplinary instructors about information literacy. Findings include focusing on pragmatic, contextual ways in which students will need to use information in the future, providing professional development opportunities for librarians to further develop faculty development skills, and prioritising strong collaborations between librarians and other academic units.

Keywords

academic libraries; action research; embedding information literacy; faculty development; faculty liaison; faculty-librarian collaboration; higher education; information literacy; USA

1. Introduction

While librarians remain invested in teaching students how to use information effectively, critically, and ethically, the ways in which they do this are changing (Jaguszewski & Williams, 2013). One approach to integrating information literacy (IL) into curricula is through direct classroom instruction by librarians – though this strategy can encounter challenges with sustainability and scalability of librarian efforts. To address these problems, another approach is the 'train the trainer' model, where academic librarians serve as faculty developers who help instructors develop more effective IL instruction (Cowan and Eva, 2017). While descriptions of the train the trainer model are appealing, it is necessary to determine the efficacy of this approach as it is applied in practice.

The successful adoption of a train the trainer model relies on understanding more about the methods and strategies of librarians engaged in this kind of work. This research project uses an action research methodology – a form of 'critical self-reflective practice' – to investigate how Purdue University librarians participating in a train the trainer program attempted to improve their individual and collective practice of embedding IL into curricula (McNiff, 2013, p.23). By 'learning in and through [the] action and reflection' of librarians participating in Purdue's IMPACT (Instruction Matters Purdue Academic Course Transformation) program, we can gain better insight into this approach to embed IL into curricula (McNiff, 2013, p.24). Many academic librarians at Purdue are faculty members. To simplify, 'librarians' refer to all Libraries' faculty members and academic professionals who participate in IMPACT, while 'faculty' or 'instructors' will refer to disciplinary instructors at Purdue.

Our findings offer five recommendations for how librarians can approach their future work as faculty developers in IMPACT. While specific to the experiences of librarians within IMPACT, they may inform other train the trainer assignment or course design efforts. The recommendations are:

1. **Plan for IL** – be strategic in introducing and helping instructors explore IL within a train the trainer program.
2. **Develop librarians** – provide opportunities for librarians to expand their faculty development and instructional design skills.
3. **Foster stronger teams** – strengthen collaborations between librarians and other teaching and learning units.
4. **Make IL practical** – communicate about IL in ways that are understandable and useful for instructors.
5. **Connect IL with other theories** – align IL theory with other pedagogical and motivational theories.

1.1 Background

Librarians at Purdue have participated in IMPACT, a provost-initiated campus-wide course redesign program, since the early 2010s. Faculty and professional staff from the Purdue Libraries, teaching and learning centre, and educational technology unit, partner through IMPACT to help disciplinary instructors create more autonomy-supportive and student-centred teaching and learning environments. Such environments generally lead to more positive student outcomes, like increased effort and persistence, as well as higher levels of academic achievement (Niemiec & Ryan, 2009; Ryan & Deci, 2017).

IMPACT adopts a Faculty Learning Community (FLC) format, where teams of three to four professionals from the three supporting units ('support team members') work with three to four disciplinary instructors ('faculty fellows' or 'fellows') from across campus for 13 weeks. Each team has a 'primary' – a support team member from one of the three units who leads group discussions and acts as a main point of contact for the fellows with questions or concerns. The

other support team members, known as 'secondaries', help the fellows reflect upon their courses and make pedagogical decisions. Figure 1 describes the typical composition of an IMPACT team, indicating how IMPACT faculty fellows, librarians, and other support team members comprise an IMPACT 'team'.

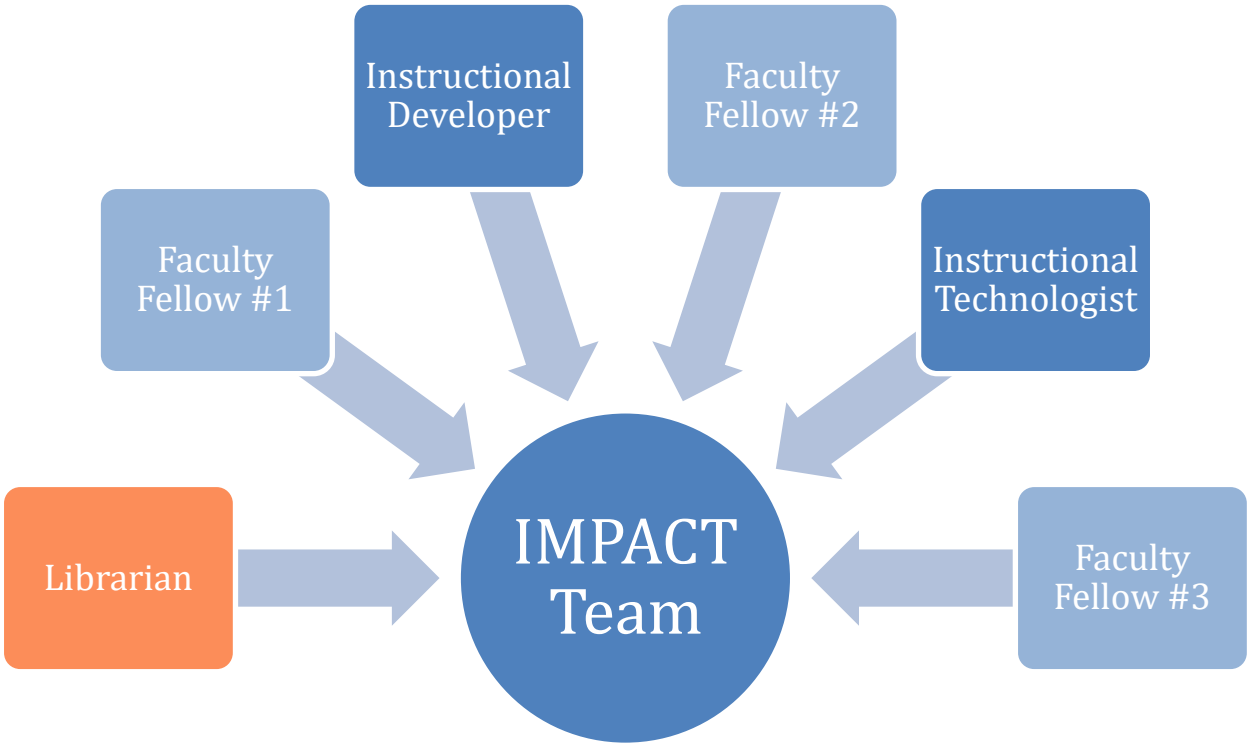

Figure 1: Purdue faculty and staff who typically comprise an IMPACT team.

The IMPACT curricula incorporates pedagogical ideas from the three units' areas of specialisation, including motivational theory, IL, and educational technology (Levesque-Bristol et al., 2019). Faculty fellows attend weekly FLC sessions to learn about a range of topics, such as learning outcomes, assessment, and learning activities – while being tasked to apply what they learn to redesigning a course. Individual teams are encouraged to have routine supplemental meetings, outside of the FLC, to delve more deeply into the weekly FLC topics and make progress on their redesign decisions.

2. Literature review

Academic libraries have long recognised the benefits of integrating information literacy into disciplinary curricula (Bruce, 2002). To accomplish such integration, librarians have collaborated with instructors in myriad ways (Mounce, 2010). Specific examples include Lecea & Perez-Stable's (2019) study where collaboration with faculty was determined to improve the IL abilities of political science students, Miller and Neyer's (2016) research documenting the use of curriculum mapping as a vehicle for collaboration with nursing faculty, and Howard, Wood, and Stonebraker's (2018) work investigating IL gaps in business curricula. While beneficial for addressing information literacy goals, these projects are typically small in scale, as one or two librarians work directly with one or two classroom instructors. To tackle scalability concerns, academic libraries have started to target their collaborative efforts at faculty development,

essentially ‘training the trainer’ to enable groups of instructors to integrate information literacy into the courses they teach (Fister, 2009; Iannuzzi, 1998). While academic libraries have been slow to offer programs where librarians act as faculty developers to help integrate IL strategically into curricula, there are notable exceptions (Hartman et al., 2014; Li, 2007; Maybee, 2018; Millet et al., 2009; Wishkoski et al., 2018; Witt & Dickinson, 2003).

To address a large-enrollment undergraduate biology course, librarians at the University of Kentucky developed workshops to help graduate teaching assistants teach undergraduate students how to effectively use databases and citation tools (Hartman et al., 2014). Librarians have also developed assignment design programs to engage instructors in conversations about how their students use information in individual courses (Wishkoski et al., 2018; Wishkoski et al, 2019) and across all undergraduate levels of a specific program (Millet et al., 2009). Assignment design programs – even those not specifically about information literacy, like the librarian-led workshop at the University of Utah – can offer instructors opportunities to improve the way they teach students to use information or how they teach students research skills (Wishkoski et al., 2018; Wishkoski et al., 2019).

The literature on faculty development programs offered by academic libraries largely focuses on examining pragmatic aspects of the programs, such as planning and implementation. Additionally, the literature examines the perceptions and goals of instructors participating in these programs. Maybee, Doan and Flierl, for example, describe different goals instructors bring to IMPACT and how they uniquely redesign their courses to help their students either gain general information skills or more authentic, discipline specific ones for a particular course (2016). Li (2007) notes that participation in faculty development can enhance libraries’ leadership role and their ability to promote particular ideas about learning across campuses (schools included the College of Wooster, Denison University, Kenyon College, Oberlin College, and Ohio Wesleyan University.). Yet, the literature on faculty development offers little insight into how librarians perceive their involvement in this increasingly prominent form of faculty-librarian collaboration.

As academic libraries have placed a stronger emphasis on academic libraries playing an integrated role in teaching and learning in recent years (Miller & Pressley, 2015; Jagusweski & Williams, 2013), the literature on IL instruction and instructional librarians has presented a challenge that librarians may struggle to adapt and identify as educators (Wheeler & McKinney, 2015; Houtman, 2010). This uncertainty around librarians seeing their role as educators has been explained in several ways, ranging from a perceived lack of expertise with pedagogy (Julien & Genuis, 2011), an unwanted shift away from or addition to collections and other traditional forms of librarianship (Austin & Bhandol, 2013), and a perceived sense of being undervalued by the faculty the librarians work with (Walter, 2008; Julien & Pecoskie, 2009). In their phenomenographic study, Wheeler and McKinney (2015) describe four ways librarians perceive their educative role including: librarians who believe they play dual roles as teachers and librarians; librarians who are teachers but do not teach in the same way as disciplinary instructors; librarians who teach but do not identify as teachers; and librarians who do not teach and do not identify as teachers.

The gravitation towards a train the trainer model, where librarians – as experts in IL – work with faculty to help design instruction that supports students learning about information in a disciplinary context, necessitates that librarians develop expertise in and take responsibility for pedagogy and instructional design (Saunders, 2009; Shank & Bell, 2011). While Library and Information Science (LIS) programs and professional development opportunities are two possible ways to address this need, a gap exists in the extant LIS literature concerning the insights, experiences, and recommendations of librarians using train the trainer models to embed IL into curricula. This action research study seeks to provide details about how librarians

involved in IMPACT perceive their role in faculty development, as well as the strategies and methods they use to improve their ability to integrate IL into curricula.

3. Methods

Employing an action research methodology, 'a systematic process of practitioner problem posing and problem solving' (Kuhne & Quigley, 1997, p.23), this study sought to address the following research question: How can IMPACT librarians improve their ability to embed IL into curricula in a program following a train the trainer approach? The researchers of this study also functioned as study participants, allowing for librarians to act as co-inquirers to develop their individual and collective ability to embed IL into curricula (Somerville and Brown-Sica, 2011). The term 'participant–researchers' is used to refer to the librarians who participated in this research and authored this manuscript. See Brown, Rich, and Holtham (2003) and Edwards and Bruce (2002) for examples of LIS educational action research concerned with IL.

Most action research approaches follow a cycle of planning, action, observation, and reflection (Kemmis et al., 2014) that is adaptable to the project's research question (Koshy, 2005). While 'rarely as neat' as the cycle suggests, Kemmis et al. suggested that the process of action research is 'likely to be more fluid, open, and responsive' than other forms of educational research (2014, p.18). Participant–researchers aimed to create plans of action, implement those plans, observe the outcomes, and reflect upon the observed results (Figure 2). While generally adhering to this cycle, the research team made several adjustments to fit their needs. For instance, the participant–researchers viewed group meetings as a chance to collectively reflect on the previous weeks in IMPACT, as well as an opportunity to plan for the coming weeks. Group meetings merged the reflection and planning aspects of the cycle, though participant–researchers also reflected individually apart from group meetings.

Location/Venue	Week 0	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13+
Participant-Researcher Debrief Meetings	Plan			Plan/Reflect			Plan/Reflect			Plan/Reflect				Plan/Reflect
PROGRAM FLC Sessions		Act and Observe			Act and Observe			Act and Observe			Act and Observe			
Individually outside of FLC sessions		Reflect	Reflect	Reflect	Reflect	Reflect	Reflect	Reflect	Reflect	Reflect	Reflect	Reflect	Reflect	Reflect

Figure 2: Plan-Act-Observe-Reflection cycle for IMPACT librarians in Spring 2019 semester

3.1 Participants

Study participants consisted of six Purdue librarians who functioned as participant–researchers. Three participant–researchers were involved in IMPACT teams during Spring 2019, while the other three had previous experience on IMPACT teams. Individual participant–researchers' experiences in IMPACT ranged from first-time team members (as of Spring 2019) to seven years. Two participant–researchers served in a leadership capacity, facilitating IMPACT classroom sessions and serving on IMPACT's management team, which designs the program's curricula and creates teams. The diverse composition of the study participant group supported peer-evaluation during the plan-act-observe-reflect cycle and yielded richer group discussions in the reflection step of the action research cycle.

In addition to the six participant–researchers, a purposive sampling of six faculty fellows from the current group of IMPACT fellows were chosen to represent six distinct disciplines and

IMPACT teams. Disciplines included management, entomology, earth, atmospheric, and planetary science, computer science, psychology, and building and construction management. Faculty fellows participating in IMPACT receive internal funding as an incentive, though no incentives were given for instructors to participate in this project.

3.2 Data collection

Data was collected during the Spring and Summer of 2019. A reflection protocol was created for participant–researchers to facilitate a common reflection data set (see Appendix 1). Participant–researchers were directed to reflect after each classroom IMPACT session. For practical reasons, such as absences from IMPACT FLCs, this was not always accomplished.

Participant–researchers met approximately every three weeks throughout the Spring 2019 semester to debrief from the previous weeks, evaluate the efficacy of previous plans, and to plan for the coming weeks (hereafter referred to as 'participant–researcher debrief meetings'). Meeting notes were taken to capture longitudinal data and group reflection discussions. Both the individual reflections and meeting notes were posted in a private Slack channel, in order to make notes and reflections easily accessible to all participant–researchers. Slack.com functioned as a shared online space for the participant–researchers to share documents like reflections, comment on other's work, and ask questions related to the research project. During Summer of 2019, a final reflection session was held to allow for participant–researchers to reflect on their overall experiences of their ability to embed IL into curricula through their participation in IMPACT.

Interviews with select faculty fellows who recently completed the Spring 2019 IMPACT FLC were conducted at the end of Spring 2019 (see Appendix 2 for interview protocol, IRB #1904022068). Gathering data relevant to embedding IL into curricula from the instructors' perspectives, the interviews also added 'learner validation' to the project, in which librarian perceptions were compared with the fellows going through the program (Vezzosi, 2006). Another variation to the traditional plan-act-observe-reflect cycle, the interviews with the fellows were added as a result of a group reflection during one of the regular group reflection meetings in order to determine if faculty fellows were learning what librarians intended for them to learn about various topics, including IL. Two participant–researchers interviewed the six faculty fellows and took handwritten or typed notes, but did not audio record the interviews to allow for more frank discussions between participant–researcher and faculty fellow. These notes were compared back to the themes from the participant–researchers' final debrief to identify areas of overlap and divergence.

3.3 Analysis

Employing McNiff's guiding principles of qualitative data analysis for action research, librarian–participants identified criteria for what we expected to happen, interpreted data in terms of the criteria, and '[came] to a conclusion' concerning how well a change was enacted (McNiff, 2013). The identified criteria are related to the participant–researcher values (McNiff, 2013). One of the core values of the IMPACT librarian team is that IL may not only play a role in student learning, but an *integral* one. Our expectations were that faculty fellows would learn how more intentional student engagements with information would support student learning. Librarian–participants also wanted IMPACT fellows to recognise how IL can be an important component for realising their broad redesign goals in IMPACT, for example increasing student engagement. The participant–researchers expected to identify and prioritise the most pressing issues concerning embedding IL into curricula, discuss solutions, and collectively analyse whether those solutions were ultimately successful. Our criteria for judging this included how faculty fellows discussed information during IMPACT classroom sessions, participant–researcher reflections on classroom FLC sessions, and faculty fellow interviews.

Individual reflections were analysed in the regular participant–researcher debrief meetings. Participant–researchers provided feedback to other participant–researchers' plans and efforts to embed IL into disciplinary curricula. Such analysis could include determining if a particular plan was successful, identifying ways to remove barriers to enact a plan to embed IL or providing suggestions for a new plan for the coming weeks in IMPACT. Regular meetings also allowed participant–researchers to analyse the Purdue Libraries' strategic approach to participating in IMPACT, revealing ways IMPACT or Purdue Libraries' leadership could better enable librarians to more effectively embed IL into curricula. In both cases, the analysis included formulating new, concrete plans of action to continue the plan-act-observe-reflect action research cycle.

To support learner validation of our findings, a sub-group of participant–researchers separately analysed the data from the interviews with faculty fellows to determine if instructors participating in IMPACT talked about IL and student learning in ways that aligned with our findings. Analysis consisted of reading interview notes, identifying salient themes from across the interviews, extracting relevant paraphrased ideas from the interview notes, and comparing and contrasting instructors' perceptions of IL, student learning, and IMPACT with our findings. Analysis involving IMPACT faculty fellow interview data took place after the Spring 2019 IMPACT classroom sessions were complete

At a final debrief/reflection meeting, participant–researchers determined that a productive way to improve collective and individual practices was for each researcher–participant to bring their top three recommendations for improving their individual practice, pragmatic, based on their reflections and group discussion data, as well as their top three collective, systematic, recommendations. Mirroring the IMPACT program as both an individual and collective effort, these recommendations highlighted the individual and group ways in which librarians experienced participating in the program. The participant–researchers compiled five specific findings that best summarised and explained participant–researchers' recommendations for improving individual and collective practices.

4. Findings

Analysis of participant–researchers' reflections and notes from group reflection meetings yielded five recommendations for librarians to improve their individual and collective practices in IMPACT for Fall 2019 and beyond. Analysis of fellow interviews complemented these recommendations and provided instructor perspectives on how information literacy plays out in the course redesign process.

The five recommendations fall within two overarching categories – pragmatic and systematic recommendations (Figure 3). Pragmatic category recommendations focus on concrete actions librarians (in this context, all future Purdue Library faculty and staff whether or not they were participant–researchers for this project) participating in the IMPACT program in the future can take, both individually and collectively, to improve their ability to embed IL into course curricula. Systematic category recommendations focus on larger, strategic changes librarians participating in IMPACT should make collectively. Findings in this category describe how librarians can change their overall approach to participating in IMPACT, such as advocating for specific changes for IMPACT leadership to consider.

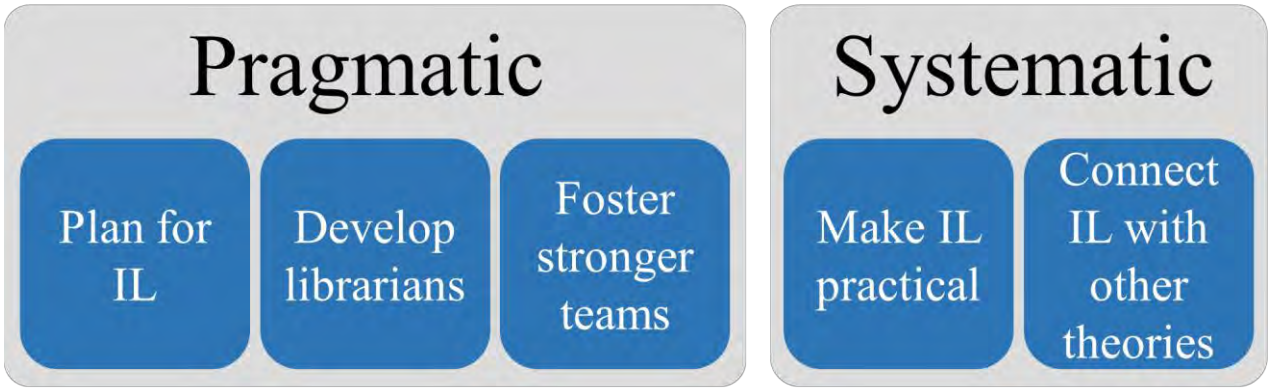

Figure 3: Recommendations

4.1 Pragmatic recommendations

1. Plan for IL

Though participant–researchers identified numerous opportunities to discuss IL, IMPACT is not an IL-centric program, and the program's curriculum and in-person FLC sessions did not typically afford opportunities for substantive and ongoing conversations about IL. In the regular group reflection meetings, participant–researchers proposed several specific strategies for overcoming this challenge, including, to the degree practicable:

- scheduling and preparing outside meetings at regular intervals throughout the semester;
- introducing IL earlier – and at strategic times – to faculty fellows; and
- providing opportunities for librarians to share examples with other members of the IMPACT support team of how they have been successful in encouraging meaningful dialogue with instructors about information.

One participant–researcher reflected halfway through the semester, '…I am becoming more suspicious that deeper discussions of IL are going to be more likely to take place if we, as support team members, really emphasize IL in earlier weeks'. Most fellows interviewed agreed that supplemental meetings provided them with the necessary time to dig deeper into conversations initiated in FLC sessions, such as those about IL, and to make substantial progress on their individual redesigns. Interviewer notes described how one faculty fellow found outside meetings to help with 'individualized problems', while another fellow wanted more meetings as 'they were not held as accountable as they could have been'. A third fellow whose team did not meet regularly for supplemental meetings said that she would have thought more deeply about FLC topics between in-person sessions if she had met with her team more often.

2. Develop librarians

Several librarians found that they would be in a better position to advance IL within the program if they had professional development opportunities to prepare them for conversations with fellows about certain aspects of instructional design, specifically:

- how to assess IL-related learning activities and assignments; and
- the scholarship of teaching and learning (SoTL).

One participant–researcher suggested that professional development on research design and SoTL would give librarians greater influence within the program. They mentioned, 'I think that we may be more likely to have fellows excited about and interested in IL in a serious way if we can make more of a name for ourselves in the SoTL opportunities ... I think that I need

to gain more experience with research design for SoTL projects, so I can feel comfortable with bringing this up as something that I (or other librarians) can help the fellows with.'

3. Foster stronger teams

Another area of consensus between the researcher–participants was the desire for all support team members in IMPACT to be able to discuss and recognise the importance of IL. Librarians found that support team members from the three units could operate with different goals in mind. For instance, some support team members prioritised demonstrating educational tools, leaving less space to discuss high-level pedagogical issues, such as how students can use information to learn. Participant–researchers proposed the following strategies to address this issue:

- use routine meetings to help support team members connect, establish team goals, and better understand the goals of the other units;
- take the initiative to start more IL-related conversations; and
- bring in guest librarians to join teams without a librarian at critical points in the semester.

One participant–researcher reflected, 'One possible option to promote IL could be to initiate a group discussion whenever there is the opportunity to talk about IL. However, this really depends on the support of the primary [support team member leading discussion].' Participant–researcher debrief meeting notes suggested that IMPACT team members could 'exclude' IL-related discussion for a variety of reasons, and so to be more effective in embedding IL into curricula within the IMPACT program, librarians needed to 'help educate support team members on what IL is, and what we [librarians] are particularly interested in accomplishing with regard to IL'. The participant–researchers recognise that helping support team members embrace the value of IL is their responsibility.

4.2 Systematic recommendations

4. Make IL practical

The librarians participating in this project emphasised the need to frame IL in ways that are understandable and useful for the faculty fellows they work with. Through individual and group reflections, participant–researchers hypothesised that instructors will be more receptive to conversations about IL if they are framed by how information supports course learning outcomes. Specific recommendations included:

- discussing information use in discipline-specific contexts rather than in abstract or theoretical ways;
- providing clear examples of how other instructors have embedded IL into their curricula; and
- avoiding the potentially confusing term 'information literacy' altogether.

While the majority of the interviewed fellows discussed in detail the important role information plays in their course, none used the term 'information literacy'. Several participant–researchers reflected that the term 'information literacy' may be alienating to people outside of libraries. One participant–researcher described that the IMPACT FLC sessions '… really lend themselves to jargon, and I think there is an opportunity to use that as a lesson about being careful with the lingo we use and making assumptions that everyone will know what they are.'

In line with participant–researchers' hypothesis that fellows will be more open to discussing IL within the context of their disciplines, interviewed faculty fellows talked about IL as discipline-specific and critical for their students' futures. Interview notes describe how one instructor believes their students are 'generators of data through their use of instruments,

which gather information on phenomena (tornadoes, etc.)' and that students in their redesigned class will 'think about data collection/generation to respond to a need – a hypothesis'. Another interviewed fellow had students engage in a form of sequenced information discovery to learn more about an area of psychological research for their future academic or professional work so that students could use 'different types of information than they are used to'. All interviewed faculty fellows described that they wanted their redesigned courses to help students learn about their professional community and gain practice in the various ways they will participate in it in the future.

5. Connect IL with other theories

It is a challenge to give IL adequate importance within a program built around other theories and frameworks. In the case of IMPACT, the motivational theory Self-Determination Theory (Deci & Ryan, 2017) and Backwards Design (Wiggins & McTighe, 2005) frame the curriculum. Participant–researchers hypothesise that fellows will be more likely to engage in conversations about IL when it is discussed in conjunction with, instead of entirely separate from, the main theories underpinning the program. Participant–researchers will target the following to better embed IL into curricula:

- discuss IL with fellows early and often in the program by helping them perceive IL as one way, among others, to motivate and engage students; and
- discuss IL in relation to the basics of instructional design outlined by Backwards Design, viz. learning outcomes, assessment, and learning activities.

Throughout the 2019 spring semester, participant–researchers noticed instances where fellows better understood IL – and how to incorporate it in their class – by considering it alongside other fundamental pedagogical concepts. One fellow, for example, identified the need for additional course learning objectives when he discussed the information processes his students needed to perform to learn within the course. In this context, the participant–researcher was able to leverage an FLC discussion on learning outcomes and objectives to tie in the need for an IL outcome for the course.

Interviews confirmed that fellows can consider IL in conjunction with the overarching Self-Determination Theory framework, which focuses on fostering student perceptions of autonomy, competence, and relatedness in a learning environment. Most interviewed fellows discussed the ways in which they would have students use information as a strategy for engaging students better. For example, one fellow sought to promote student perceptions of autonomy by having students find their own sources of information. Another fellow attempted to foster student perceptions of competence and relatedness by having students collect, process, and analyse data according to the specific standards within their disciplinary field. Interview notes described a learning opportunity when a group of students 'only managed to collect two' data sets when they needed three data sets, requiring students to 'go back and change their hypothesis and work through the challenges of collecting data for research'. Such instances could foster student perceptions of autonomy – being given the ability to solve their own problems – and competence, by helping the students solve a disciplinary authentic problem relating to data. Both faculty fellow interviews and individual participant–researcher reflection data suggest that IMPACT fellows made the connection between information use and motivating students to learn.

5. Discussion

Our findings contribute to understanding librarians' experiences within a train the trainer paradigm for embedding IL into curricula. Focused on a specific context, some findings from action research may not be generalisable. However, the findings from this study do suggest concrete ways academic librarians can improve their efficacy of embedding IL into curricula in

faculty development programs. While typical programs include formal classroom instruction and procedures, it is worth noting that many of our findings relate to how academic librarians can work better outside of the formal aspects of IMPACT – specifically in meetings outside of the FLC. Participant–researchers also described ways to interweave IL theory and practices with other theories, viz. Self-Determination Theory and Backwards Design, which may show up in similar programs. Librarians may be able to successfully embed IL into curricula through programs not expressly focused on IL by connecting IL to other important pedagogical ideas.

The original research design and group reflection meetings tended to focus on the formal FLC classroom sessions where support team members and faculty fellows spend the majority of their time together. Yet, most findings related to improving the participant–researchers' individual and collective practices do not directly relate to the 13 weeks of classroom FLC instruction in IMPACT. Participant–researchers had better opportunities to discuss IL with fellows in follow-up team meetings, where they could sustain conversations about topics not focused on in the FLC classroom sessions. Our data suggests several benefits of focusing IL efforts towards scenarios where instructors work one-on-one with instructional designers or librarians on implementing a desired pedagogical plan. Such opportunities afford librarians the time and access to more organically mention IL in the context of student learning in the instructor's course and demonstrate the concrete value IL can bring to solving common pedagogical problems.

Such findings provide evidence that participant–researchers engaged in critical self-reflective practice and avoided the simplistic, overly optimistic solutions McNiff warns about (2013). IMPACT is a collaboration between multiple units on campus, and the participant–researchers' agency is limited concerning the curriculum and who leads group discussions. Despite these challenges, the participant–researchers found other avenues to embed IL into curricula more effectively and demonstrate the value of IL to student learning.

Participant–researchers also took advantage of the regularly scheduled support team meetings to advocate for and educate other units about a larger role for IL, in order to make IL a shared topic of interest for all support team members who help fellows make pedagogical decisions. These opportunities helped librarians demonstrate concrete examples for how IL can advance student motivation and learning to all IMPACT support team members. Findings suggest that librarians should increase, and better strategise about, discussions around IL with faculty fellows and other support team members in these less formal settings. These settings are opportunities to communicate in plain language how information can be used more intentionally and creatively to support student learning.

Librarians involved in multi-unit programs like IMPACT should also invest time in establishing strong relationships with partnering units, like teaching and learning centres. Building productive teams and providing memorable examples for how IL can be meaningfully embedded into curricula in support of student learning are worthwhile investments to underscore how librarians can advance student learning. Professional development opportunities can also be mutually beneficial, with librarians learning about relevant pedagogical topics, for example assessment, from instructional developers while instructional developers can learn how information can be used to support student engagement or other pedagogical goals. Librarians can enhance their ability to embed IL in curricula by making IL a shared topic of interest.

To help instructors make better pedagogical choices, faculty development programs place an emphasis on teaching and learning theories, for example Backwards Design and Self-Determination Theory. Librarians can further the case for embedding IL into courses when they demonstrate how IL theories connect to these pedagogical ideas and contribute broadly to student learning. Providing sufficient evidence of advancing student learning through library programming or direct instruction can be difficult given the innumerable variables at play in

educational research. Tying IL in with student motivation is one promising avenue for bolstering librarians' claim that IL can advance student learning. Extending the research demonstrating how student motivation can play an important role in student persistence and academic performance (Niemiec & Ryan, 2009; Ryan & Deci, 2017), librarians can aim to provide evidence for how interactions with information can enhance student motivation and thereby contribute to student learning (Flierl et al., 2017). Librarians are more likely to have substantive IL conversations with instructors when they can reinforce connections between IL and other theories with scholarly evidence.

IL does not necessarily need to be the focus of a train the trainer program where librarians want to embed IL at a curricular level. Our findings indicate that rich conversations about IL occurred because IL was brought into conversations to help solve a pedagogical problem important to a fellow – for example, creating a more motivating and engaging classroom environment by tasking students to synthesise information from various contexts to solve an open-ended problem. Connecting IL to other pedagogical ideas in the name of addressing challenges, librarians can sidestep the issues of defining IL to audiences unfamiliar with the term or having to argue for why it is valuable. In professional development contexts, IL theories and practices can work in harmony with theories concerned with student learning.

5.1 Future directions

Academic librarians can take advantage of the numerous opportunities to collaborate with established professional development programs at their institutions to advance IL efforts in sustainable and scalable ways. While the train the trainer model is a promising model for embedding IL into curricula, further investigation of the efficacy of this approach in a range of academic library contexts is necessary. This includes further research into the experiences of academic librarians working as faculty developers. More theoretical work is required, as well, to help tell the story of how IL contributes to student learning in higher education. Academic librarians can research the relationships between IL, motivational frameworks like Self-Determination Theory, and academic success. While the train the trainer model helps mitigate issues of sustainability and scalability of librarian efforts at Purdue, the academic library community can benefit from knowing more of the barriers, challenges, and affordances of implementing this approach.

6. Conclusion

Investigating the perceptions and experiences of academic librarians participating in faculty development programs is important – especially as librarians explore train the trainer as a viable way to provide scalable, sustainable IL instruction to students. Using an action research methodology, this study examined librarians' experiences of embedding IL into curricula within a faculty development program, providing insights into how the participant–researchers could communally and individually improve efforts to embed IL into curricula. Some results of this project may not be applicable to all contexts, given the variations between faculty development programs. Other findings are likely to be applicable more broadly.

Embedding IL into courses to support student learning may not require formal classroom instruction. A consultative approach between librarians and instructors – within or outside of a program – can be an effective way to advance IL instruction. Librarians may also be better able to embed IL into curricula by not making IL the central theoretical component of these consultative efforts. Pragmatic and systematic findings of this action research project demonstrate the complexity of working with partner teaching units on campus and instructors from diverse disciplines to train the trainer and create more student-centred teaching and learning environments. However, librarians should capitalise on existing opportunities to partner with other educational units and instructors. Finding new ways to meaningfully embed IL into curricula helps librarians further teaching and learning in higher education.

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Appendix 1: Reflection protocol

1. What, if anything, happened this week related to integrating IL into courses?
2. What are some options for moving forward with integrating IL, and why do you think they might work?
3. Anything noteworthy to report this week?

Appendix 2: Interview protocol

1. Describe your overall experience in IMPACT.
2. You have content, like theories, skills, or procedures you want students to learn. How do you expect your students to use information or data to learn that content?
3. Do you expect you will need to help students learn to use information/data in your course? Why or why not?
4. During the IMPACT classroom sessions this semester, did you ever think about how students will be using information or data in your course? How so?
5. Is there anything else you would like to share?