Hands-Joined Learning as a Framework for Personalizing Project-Based Learning in a Middle Grades Classroom: An Exploratory Study

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Abstract

This study investigates the hands-joined learning framework as an approach to personalize and provide instructional scaffolding within project-based learning. The authors include a case description of hands-joined learning in a middle school social studies classroom and critically examine middle school student feedback in relation to two aims: (a) personalizing learning, and (b) providing adequate scaffolding. Student feedback indicated that the hands-joined learning project was largely successful in these two areas. Learners appreciated having choice and control in what they learned and created in the project but also pointed to the need for greater opportunities to make decisions in how they learned. Some learners also wanted more peer interaction. These findings are used to propose practical implications as well as future research directions.

Keywords: personalized learning, active learning, middle school, project-based learning, student perceptions, social studies

Personalized learning is a learner-centered educational reform that reframes education as tailored for and by individual students (Patrick, Worthen, Frost, & Gentz, 2016). Many initiatives aimed at supporting teachers and schools in implementing personalized learning call for nothing short of a complete paradigm shift from traditional models of instruction (Bishop, Downes, & Nagle, 2017). While differentiated instruction and individualized learning are largely mainstream approaches in American public education, the fundamental difference between these approaches and personalized learning is that personalized learning requires teachers and learners to share power in deciding what individual learners will learn, how they will learn it, and how they will...
demonstrate their learning (Bray & McClaskey, 2015). This sharing of power is a strategic move to increase motivation, engagement, and learner voice (Toshalis & Nakkula, 2012) with the broader aim of teaching students to be “expert learners”—individuals who want to learn, who know how to learn, and who, in their own individual and flexible ways, are well prepared for a lifetime of learning” (Bray & McClaskey, 2015, p. 164).

The idea of sharing power is not new to middle grades teachers. Learner voice has long been a hallmark of middle level philosophy and is evident throughout the This We Believe conceptual framework for “Successful Schools for Young Adolescents” (National Middle School Association [NMSA], 2010). In this vision for middle grades education, phrases such as empowering, relevant, and active and purposeful learning are used to describe developmentally responsive middle grades learning experiences, each of which hints at the need to provide middle grades learners with opportunities to be in the driver’s seat of their own learning. This notion is further affirmed in This We Believe in Action in which Nesin (2012) asserted “for students to become active in the learning, teachers need to give up some control” (p. 25). This emphasis on sharing power in middle grades philosophy thus creates especially fertile ground for personalized learning approaches that ask for teachers to make similar shifts away from traditional teacher-centered instructional practices. For this reason, personalized learning is of particular interest to middle level education researchers, as evidenced by the emphasis on it in the Middle Level Education Research Special Interest Group Research Agenda (Mertens et al., 2017).

Given the philosophical alignment between middle grades philosophy and personalized learning, recent state and district-level reform efforts to enact personalized learning present a promising opportunity for middle grades educators and advocates. For example, Act 77 in the state of Vermont mandates that 7th–12th grade classrooms move toward personalized learning, proficiency-based learning, and flexible pathways to graduation (Senate Committee on Education, 2013) and offers legislative support to middle grades advocates who aim to amplify student voice in schools. However, such reforms also present considerable challenges for schools, teams, and teachers. Emerging scholarship on personalized learning at the middle level has shown, for example, that it can be difficult for teachers to strike the appropriate balance between providing adequate instructional scaffolding without stifling learner ownership (Demink-Carthew, Olofson, LeGeros, Netcoh, & Hennessey, 2017; Netcoh, 2017).

Additionally, structures of implementation may create conflicts that can slow or deter adoption, resulting in schools instituting stand-alone personalized learning experiences such as “passion projects” or “genius hours” that are separate from content classrooms (Bishop et al., 2017). While these approaches show great promise for engaging learners (LeGeros, Netcoh, Olofson, Downes, & Bishop, 2018), their separation from the core curriculum may do little to shift the prevailing paradigm of the school day (Netcoh, 2017).

Due to the considerable conceptual alignment between project-based learning and personalized learning, some have argued that project-based learning is a promising pedagogy through which learning can be personalized (Bishop, Downes, & Farber, 2019). With this in mind, DeMink-Carthew and DeMink (2016), a middle level education researcher and middle school classroom teacher respectively, developed the framework for hands-joined learning projects as a means to illustrate how project-based learning can be personalized. The term “hands-joined” was inspired by the following excerpt from This We Believe in Action: Implementing Successful Middle Schools (Association for Middle Level Education, 2012):

Developmentally responsive middle grades educators take the concept of hands-on activities further by promoting what might be termed “hands-joined” activities, ones that teachers and learners work together in developing. Such activities foster ownership and lead to levels of understanding unlikely to be achieved when learners are simply completing teacher-made assignments. (p. 16)

Building on this concept, hands-joined learning is a variation of learner-centered project-based learning (Buck Institute for Education, 2018) intended to support teachers and learners in co-designing projects that are both of personal interest to students and connected to a shared classroom theme. As an increasing number of teachers seek to personalize learning, hands-joined learning was designed as a collaborative effort between a teacher and education researcher with the goal of exploring how project-based learning experiences can be infused with elements of personalization, primarily through student decision-making and choice throughout the project. Additionally, because active learning and student choice have been found to be challenging and at times overwhelming for students (Demink-Carthew & Netcoh, 2019; Morrison, 2008; Schwartz, 2004; Smith & Cardaciotto, 2011), instructional scaffolding is an
essential element throughout each phase of hands-joined learning.

Because the hands-joined learning framework has yet to be empirically researched as an instructional approach to personalize learning, this study was designed to offer a case description of the first hands-joined learning project and, through the analysis of a case description and middle school student feedback, investigate the following research questions:

1. To what extent was the hands-joined learning project successful in providing learners with opportunities for personalized learning?
2. To what extent was the hands-joined learning project successful in providing learners with appropriate instructional scaffolding?

Review of Literature

In this section, we review literature that is central to the design and focus of this study. Due to the varied conceptions of personalized learning that exist, we begin by identifying the definition of the concept that informs this study. We then explore theoretical perspectives and empirical research related to young adolescent motivation. Next, we define project-based learning and discuss its potential relationship with personalized learning. Subsequently, we examine literature that points to the important role of scaffolding in personalized learning and, lastly, we review literature that underscores the critical need to investigate learner perceptions of purportedly learner-centered approaches such as personalized learning and hands-joined learning.

Defining Personalized Learning

Personalized learning has received growing attention in recent years as schools and districts across the United States are seeking effective ways to meet the diverse interests and needs of their students and raise academic achievement (Bingham, Pane, Steiner, & Hamilton, 2016; Sykes, Decker, Verbrugge, & Ryan, 2014). Despite growing national interest in personalized learning, its definition, philosophical underpinnings, and subsequent enactment vary widely from setting to setting. Our conception of personalized learning is undergirded by progressive commitments that emphasize learner-centered environments informed by constructivist learning theory. As such, this study was informed by the following learner-centered definition of personalized learning offered by Bray and McClaskey (2015):

In a personalized learning environment, learners actively participate in their learning.

They have a voice in what they are learning based on how they learn best. Learners have a choice in how they demonstrate what they know and provide evidence of their learning. In a learner-centered environment, learners own and co-design their learning. The teacher is their guide on their personal journey. (p. 14)

Central to this definition is the role of learners’ voices in personalized learning environments, particularly in the design of their learning. Learners are seen as active agents in setting the conditions for their own learning. The passive role that learners have traditionally played is upended in personalized learning as learners are asked to actively explore and identify their interests and, working with teachers, generate and shape learning experiences that are informed by these interests. From this vantage point, simply adjusting the pace and content of learning for learners would not qualify as personalized learning. For this reason, one way in which personalization can be distinguished from differentiation and individualization is the extent to which teachers share decision-making power with learners (Bray & McClaskey, 2015). Supporting students in making choices in their own learning is, thus, a critical aspect of personalized learning and a key component of the hands-joined learning approach that this study investigates.

Young Adolescent Motivation

Calls for teachers to share power with students in middle grades education are supported by both self-determination theory (Ryan & Deci, 2000) and young adolescent developmental theory (NMSA, 2010). Self-determination theory suggests all humans have an innate psychological need for autonomy and motivation is correlated with the extent to which this need is met. During early adolescence, a person’s need for autonomy increases considerably (Eccles & Wigfield, 1997), therefore middle grades instruction that emphasizes teacher control and limits decision-making opportunities for students may tend to have a negative effect on young adolescent motivation (Eccles et al., 1993), and a pervasive mismatch between student needs and classroom practices may cause a decline in motivation in early adolescence (Eccles & Midgley, 1989). Developmentally responsive teaching at the middle level thus necessitates meeting students’ desire for autonomy,
and personalized learning approaches that strategically share power with students may be one way to meet this need. In the hands-joined learning framework described here, teachers share power with middle grades students and meet their need for autonomy by providing opportunities for students to make meaningful decisions about their learning. However, because hands-joined learning has yet to be empirically researched, this study aimed to investigate the extent to which middle grades students engaging in a hands-joined learning project agreed that the project enabled them to make meaningful decisions about their work.

**Project-Based Learning as a Promising Pedagogy for Personalization**

The Buck Institute for Education (2018) defined project-based learning as “a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging, and complex question, problem, or challenge” (para. 4) and asserts that “Gold Standard PBL” (para. 13) includes the following essential design elements: a) challenging problem or question, b) sustained inquiry, c) authenticity, d) student voice and choice, e) reflection, f) critique and revision, and g) public product. Project-based learning has been associated with a range of learner outcomes including conceptual knowledge, problem solving skills, and motivation (Blumenfeld et al., 1991; Darling-Hammond, 2008; Thomas, 2000). In addition, project-based learning has begun to permeate the core curriculum through content courses due in part to evidence that it can impact student learning and may be more effective that traditional modes of instruction (Kingston, 2018).

Given the increasing popularity of project-based learning and its success in permeating the core curriculum, we believe that one particular fruitful route to personalization may be to find ways to support teachers in experimenting with personalized instruction through project-based learning. In part due to its emphasis on student voice and choice, Bishop et al. (2019) identified project-based learning as one of several “promising pedagogies for engaging and empowering learning” (p. 159), asserting that it “can provide several essential ingredients for engaging and personalized learning.” The framework for hands-joined learning that is the focus of this study is thus designed to offer an illustration of how one might personalize instruction through project-based learning and to investigate the extent to which learning is personalized within a specific hands-joined learning project.

**Scaffolding within Personalization**

A common misconception about active learning approaches like project-based learning and personalized learning is that they preclude the instructional scaffolding needed for students to learn effectively (Hmelo-Silver, Duncan, & Chinn, 2007). Scaffolding plays a critical role in active learning pedagogies, however, and has an especially important role to play in personalized learning due to the central role of student choice. Although student choice has been found to support student autonomy and engagement in learning (Assor, 2012; Ryan & Deci, 2000), making choices can be challenging for some students because they may be unfamiliar and lack experience with the process (Demink-Carthew & Netcoh, 2019; Morrison, 2008). Additionally, too much choice without clear guidelines and limitations can be overwhelming, resulting in learners who “become controlled by the choices that surround us rather than the other way around” (Brockett, 2006, p. 28). With these challenges in mind, special attention must be given to instructional scaffolding within personalized learning experiences.

Informed by Vygotsky’s (1978) notion of the zone of proximal development, we view instructional scaffolds as any strategy, resource, or approach that helps learners “accomplish more difficult tasks than they otherwise are capable of completing on their own” (Singer, Marx, Krajeik, & Chambers, 2000, p. 170). Examples of scaffolding strategies commonly used in project-based learning include modeling with think-alouds, breaking a topic into smaller parts, and using graphic organizers (Field, 2018). Scaffolding strategies that offer structure, however, sit in tension with the notion of learner autonomy because a teacher’s use of scaffolding to support learners must not diminish learners’ ownership and decision-making power. The challenge for teachers seeking to personalize learning, therefore, is to achieve a healthy balance of providing scaffolding without stifling learner voice. Because the framework for hands-joined learning was developed, in part, to address the particular challenge of scaffolding in personalized learning projects and has yet to be empirically researched, this study seeks to investigate learner perceptions regarding the approach to instructional scaffolding in a specific hands-joined learning project.

**Learner Perceptions of Personalized Learning**

The emerging body of research about personalized learning is largely focused on describing these approaches in practice (e.g., Pane, Steiner, Baird,
Hamilton, & Pane, 2017; Patrick et al., 2016) and understanding shifts for teachers (e.g., Jobs for the Future and the Council of Chief State School Officers, 2015; Nagle & Taylor, 2017). While there is an emerging body of scholarship examining personalized learning in the middle grades, there is very little written about the perceptions of middle grades students who are engaged in personalized learning (Williams, Wallace, & Sung, 2016). Netcoh (2017), a noteworthy exception, explored middle grades learner perspectives on a personalized learning initiative through focus groups. Through investigating learner perspectives, Netcoh found “teachers and students had different values, expectations, and interests related to student choice, which contributed to struggles for power and control within the personalized learning class” (p.383) and, in addition, “for some students, the profusion of choice and lack of structure contributed to feelings of boredom and loss of interest” (p. 389). The findings of this study show the critical role that learner perspectives can play in personalized learning experiences and highlight the need for further research focusing on the learner perspective.

Overall, however, the general lack of attention to learner experiences in the research base on personalized learning is concerning for two reasons. First, if personalized learning experiences are designed with the intent of empowering learner voices, one important measure of success is the extent to which learners feel that they do indeed have a voice in their learning. Second, a failure to understand the perspectives of learners in personalized learning environments runs the risk of well-intentioned stakeholders expending considerable time, energy, and resources in redesigning schools and learning experiences based on initiatives that are falling short of their intended purpose. In other words, to better understand if a personalized learning initiative is achieving the goal of empowering learner voice, it is critical for investigators to seek out learner voices in their research. With this in mind, the present study was intentionally designed to investigate the learner perceptions of middle grades students regarding a hands-joined learning project.

Methodology

Context and Participants
This research took place in a Vermont public middle school that is among the most racially and ethnically diverse in the state. This study took place in 2016, approximately three years after the passage of Act 77, which legislated flexible pathways to graduation that include proficiency-based graduation expectations and personalized learning plans in grades 7–12 (Senate Committee on Education, 2013). At the time of the study, the school had been experimenting with personalized learning with teams, teachers, and classrooms at varying stages of implementation. Additionally, the entire school had been engaged in a 1:1 technology initiative for several years and as a result, at the time of this study, each student was in possession of a school-assigned iPad through which they could access classroom materials and use a variety of applications to create products to demonstrate learning.

The hands-joined learning project described in this study took place in a 7th–8th grade multi-age social studies classroom as part of a unit on colonialism, which provided the overarching theme for the project. The participants included the teacher participant, herein referred to by the pseudonym William, and the participating middle school learners. William is part of a team of four teachers, each primarily responsible for one of the following core subjects: English language arts, science, mathematics, and social studies. With the exception of lunch and elective time, the team possessed autonomy over their team’s schedule due to the absence of a bell schedule, resulting in the ability to use large blocks of time flexibly for purposes negotiated as a team. All eighty-nine learners on William’s team participated in the hands-joined learning project as part of their classwork and all learners who participated in the project were invited to complete the survey. Eighty-one families provided consent for learners to complete the survey and share their work, resulting in a sample of middle school students who were spread across William’s four heterogeneously grouped multi-age classes.

Data Collection
To investigate our research questions, we collected two types of data. We collected qualitative data to help us create the case description of the hands-joined learning project and we an online survey with both Likert-scale and open-ended items designed to collect student feedback about aspects of personalization and instructional scaffolding in the project.

Case Description Data Sources. The qualitative data sources we used to build the case description included a teacher implementation journal and teaching materials. As part of the preparation for this study, we co-developed with William key scaffolding
tools associated with the hands-joined project and we collaboratively revised them throughout the project based on the evolving needs of the learners. Throughout the project, William maintained a journal in which he recorded the date, focus, and a bulleted list of the day’s activities for any teaching day associated with the hands-joined learning project. William also maintained a shared online folder in which he placed blank copies of any teaching materials used in class to support the hands-joined learning study. The contents of the folder included worksheets, assignment overviews, discussion prompts, presentation slides, and pictures documenting artifacts from in-class work.

**Student Feedback Survey.** We collected student feedback associated with each of the research questions using an anonymous online survey designed specifically for this project (see Appendix). To ensure the form would provide data that was useful for research and classroom feedback, we collaborated with William to create questions that aligned with the goals of personalization and instructional scaffolding and crafted the phrasing to be specific to the classroom context. The survey consisted of a mix of Likert scales and two open-ended prompts: (a) What is one thing you especially liked about the Colonialism project? (b) What is one idea you have for making the Colonialism project better? Students completed the feedback survey in class on their school-issued laptop computers using an online application. The Likert scale questions asked for student feedback regarding the following aspects of Bray and McClaskey’s definition of personalized learning: (a) student decision-making, (b) active role in designing learning, (c) student ownership, and (d) purposeful work. Because William often asked students to provide online feedback about projects and units of instruction, students were accustomed to completing surveys in his class. Before students began the feedback survey, William told them that the purpose was to learn more about student experiences with hands-joined learning—both good and bad—and that their input would be used to continue to improve the project. He also encouraged students to be honest, reassured them that the survey was not being used to evaluate him as a teacher, and reminded them that their responses were anonymous. Of the eighty-one students who provided consent for participation, seventy-nine completed the full survey and two participants only completed the questions related to personalization.

**Data Analysis**

Data analysis for the creation of the case description consisted of reviewing the data sources with the purpose of writing a description of each phase of the hands-joined learning project. We sequentially organized units of data from relevant data sources into a data display consisting of two parallel outlines—one describing the phases of the project and another identifying units of data associated with each phase. We then shared this table with William, who provided feedback to ensure that we accurately captured the key events in each phase of the project. Our interpretive process followed Marshall and Rossman’s (2010) assertion that in “choosing words to summarize and reflect the complexity of the data, the researcher is engaging in the interpretive act, lending shape and form—meaning—to mountains of raw data” (p. 222). We continued our interpretative process through the writing of the final case description, which was again reviewed by William.

Analysis of data to answer the two research questions consisted of analyzing all data sources associated with the case and coding units of data that were related to “personalization” and “instructional scaffolding.” Learner feedback was then incorporated into the analysis using the student feedback survey data. Because the Likert scale questions were intended to provide a general summary of the self-reported perceptions of the larger group, we tabulated learner responses for each category of the Likert scale for prompts 1–9 into a summary table. We then inductively “pattern coded” (Miles, Huberman, & Saldaña, 2014, p. 86) the responses to the open-ended questions for themes and, once dominant themes began to take shape, we deductively coded all learner responses, incorporating units of data into existing themes and creating new themes as they emerged in the new data. We then organized all units of data into a “data display” (Miles et al., 2014, p. 105), which was subsequently used as to draw conclusions. To better understand the variation in student responses on the student feedback survey, we also looked closely at the open-ended responses of students who responded in ways that deviated from the majority to better understand their reasoning and incorporated these responses into the description of findings where relevant.

1 The “Colonialism project” was used in the survey because it was the name used by students in class to refer to this particular hands-joined learning project.
Case Description of Hands-Joined Learning

In this section, we provide a brief case description of the hands-joined learning project. We describe implementation of the project in five phases for the sake of clarity, though the learners at times moved iteratively between phases. In Table 1 we summarize the instructional scaffolding tools we used in each phase of the project. All graphic organizers and shared resources, with the exception of books, were created and shared using Google Documents. The use of Google Documents was an intentional move to allow the teacher to view student work in real time, provide embedded feedback, and keep a running record of student progress over time.

Phase 1: Identifying a Theme of Learner Interest
This hands-joined learning project took place within a unit of instruction focused on colonial America and was centered on the overarching theme: *Multiple Perspectives in Colonial America*. This theme was selected by the teacher because it (a) addressed content standards, historical thinking standards, and principles of critical literacy; (b) presented the opportunity for learners to investigate cultural perspectives of personal interest to them; and 3) was especially ripe for “real world” connections to current issues and events such as Black Lives Matter, the Dakota Access Pipeline protest, and the international conversation about the gender wage gap.

Phase 2: Co-developing Inquiry Questions
The teacher used a 90-minute block of instructional time to support learners in the collaborative brainstorming of inquiry questions. This began with a brief project overview of the hands-joined project to orient learners to the big picture. This overview included a walk-through of a checklist, complete with due dates, which was shared as a Google Document with all learners. Because all resources were hyperlinked within this document, this checklist was subsequently used as a virtual landing page for all future work. Learners then engaged in three phases of question brainstorming: (a) station rotations, (b) a gallery walk, and (c) small group brainstorming.

For the station rotations, learners moved through the room to six stations each featuring a poster with a title and picture representing one of six perspectives from colonial America: female African slaves, male African slaves, female Native Americans, male Native Americans, female white colonists, and male white colonists. Learners then used post-it notes to write down any questions they might have about each of these perspectives, sticking the notes to the relevant posters. Once learners cycled through all of the stations, they then revisited each station as a gallery walk, this time with a graphic organizer on which they recorded questions from each poster that were most interesting to them. Lastly, William used a fishbowl teaching strategy to model the expectations for how learners should work together to engage in small group

| Table 1 | Scaffolding Strategies Used in the Hands-Joined Learning Project |
|---------|---------------------------------------------------------------|
| List of Scaffolding Strategies | Scaffolding Strategies Specific to Each Phase of the Project |
| - Big picture overview with links to key resources and graphic organizers | Station rotations to explore each perspective |
| - Modeling the use of each graphic organizer | Gallery walk to see ideas brainstormed by peers |
| - Providing examples of completed graphic organizers | Graphic organizers to scaffold the development of inquiry questions |
| - Sentence starters and question stems on graphic organizers | Fishbowl technique to model small group tasks |
| - Small group work to generate ideas | Inquiry question bank |
| - Drafting templates for final products | Individual question brainstorm |
| - Submission of work and feedback before progressing to the next phase | Co-planning graphic organizer including the following sections: |
| - One-on-one project conferences | • Inquiry question |
| | • Product |
| | • Resources |
| | • Standards |
| | • Sub-questions |
| | | Project choice menu |
| | | Online resource list (organized per perspective) |
| | | Bins of books (organized per perspective) |
| Project Phase | Facilitating Inquiry | Annotated bibliography & note-taking graphic organizer |
| Co-Developing Inquiry Questions | Prototype/draft templates | Prototype/draft |
| Co-Planning | Self-assessment rubric | Self-assessment rubric |
brainstorming. For this task, each group used their graphic organizers from the gallery walk and any new ideas that emerged through discussion to draft at least three questions per perspective (or in some cases multiple perspectives), ensuring that each of these questions connected in some way to at least one of two essential questions: (a) Why/how did people come to the Americas? (b) How did the land, resources, or perspective of their group impact how the group lived in colonial America? After class, William summarized all of their questions into an inquiry question bank, removing redundancy and revising phrasing as needed. Example questions included the following:

I wonder how/why African male slaves were chosen to come to America?
Were female African slaves treated differently because of their gender?
What happened to the children of slaves?
What role did Native American females play in their tribes?
Why did some Native American females play with the colonists?
Why did white colonial males think that their race was superior?
How different were the rights of female colonists from male colonists?
What was the relationship between Native Americans and enslaved Africans?

Phase 3: Co-Planning
The co-planning phase of the project spanned three class periods, totaling approximately two hours, during which time learners moved through several phases of planning: (a) identifying a personal inquiry question, (b) mapping their question to the content and historical thinking standards, and (c) creating an initial plan for their project. To begin co-planning, learners were provided with a link to the inquiry question bank described in the previous section and they completed an individual question brainstorm in which they were asked to identify three questions that were personally interesting. For each question, they were asked to identify the perspective(s) the question would be exploring and to select at least one content standard and historical thinking standard from a list provided that they could address by investigating this question. After receiving feedback from the teacher, learners then completed a co-planning graphic organizer, which was designed to support learners in committing to one inquiry question and thinking through their project before launching into their research. This co-planning graphic organizer consisted of five sections:

1. Inquiry Question: identifying an inquiry question and a rationale for why they chose this question,
2. Product: identifying a potential product and a rationale for why they chose this product,
3. Resources: identifying a set of beginning resources for their inquiry,
4. Standards: identifying which content and historical thinking standards they believed their project would address, and
5. Sub-Questions: identifying 15 sub-questions connected to their inquiry question to assist with research and ensure that the inquiry question was rich enough.

Sentence starters and examples were provided in each section. In addition, to assist learners in particular sections of the planning tool, links to additional resources or supports were provided including a project choice menu with product ideas for learners to use as a starting point (e.g., postcards, journal, digital story, graphic novel, script, musical composition). In the section devoted to identifying resources, William provided a link to an online resource list for each perspective. Additionally, he collaborated with the school librarian to identify developmentally appropriate books associated with each perspective. These books were available in labeled bins throughout the room.

Phase 4: Facilitating Inquiry
The facilitating inquiry phase took place over three weeks, with approximately 45 minutes of class time devoted to the project two times per week which, in some cases, was supplemented by additional optional inquiry at home or during flexible work time throughout the school day. In this phase, learners explored the resources they had identified and took notes using an annotated bibliography and note-taking graphic organizer. On the top of this document, students identified their inquiry question, sub-questions, and search keywords. The remainder of the document was formatted as a t-chart with one column in which the students identified a specific resource and another column in which they took bulleted notes about what they learned in relation to their questions from each resource. Depending on the nature of the project, some learners chose to simultaneously begin drafting their products while others waited until their research was complete before working on their products. Before creating their final product,
However, all learners were asked to submit for feedback a prototype or draft of their product vision accompanied by a self-assessment using the project rubric. Learners decided what draft format would work best for their project and William created a resource folder of example prototype/draft templates for the learners to use or adapt.

Phase 5: Authentic Sharing
The sharing day was structured as a gallery walk in which learners displayed their final products and, in some cases, an accompanying poster to explain their work. Families, faculty, and other middle school teams were invited to tour the gallery walk, ask questions, and engage with the learners who were spread across four classrooms and the school media center. Two students who were finished with their projects assisted William in creating the invitation, which included a video “teaser” in which several students from each class spoke about each of their projects. On the day of the gallery walk, learner projects were organized loosely by theme. Due to the variation in learner products, this resulted in a multimedia experience within each room. For example, in one room products included original music compositions, journals, videos, animations, original art, and informational posters. In addition, William created a schedule that allowed presenters to take a break and visit the work created by teammates who were not in their class. Although learners were not expected to prepare a speech, this gallery walk structure required that students be prepared to explain their projects and answer questions about their work with an authentic audience.

Analysis of Personalization and Scaffolding in the Hands-Joined Learning Project
This study focused on two questions about the extent to which the hands-joined learning project achieved two aims: (a) providing learners with opportunities for personalized learning and (b) providing learners with appropriate instructional scaffolding? In this section, we use the learner feedback we collected to critically analyze the extent to which the hands-joined learning project met these two aims.

Aim 1: Personalization
Throughout the hands-joined learning project, learners were given multiple opportunities to make meaningful decisions including their topic, inquiry question, which historical thinking standards to emphasize, their key resources, and final product. In personalized learning, learners are given opportunities to make decisions about the design of their own learning as a way to engage them as active participants, which may ultimately result in students feeling a sense of purpose and ownership in their work. Student feedback strongly suggested that the hands-joined learning project was successful in achieving goals related to personalization (Table 2). The vast majority of students selected the fully positive or marginally positive response for each question and the fully positive response was the most popular response to all questions. Most resoundingly, seventy-three of the eighty-one total students responded with the most favorable response with regards to feeling like they were the “owner of my work.”

The most variability was evident in student responses regarding the extent to which the project felt purposeful to them. Forty-five students responded “a lot” to this item, thirty-four students responded “yes, kind of,” and two students responded “only a little bit.” Two of the students who responded “only a little bit” to this prompt also responded “only a little bit” in response to whether or not they had an “active role” in the design of their learning. A closer look at their open-ended responses revealed that one of these students would have preferred “complete freedom” while the other would have liked less “planning stuff,” referring to the co-planning tools that were used to scaffold student learning. The responses of these two students among the eighty-one respondents may indicate a potential tension between the goal of personalization and the instructional scaffolding approach used in the hands-joined learning framework.

An analysis of the open-ended responses revealed several aspects personalization that were especially valuable to students: (a) making choices and having freedom, (b) having a sense of control and independence, and (c) creating and sharing a unique final product.

Learners Appreciated Making Choices and Having Freedom. Choice was a clear and dominant theme across student responses with frequent use of the words choose, choice, and pick. The words freedom and free were also used multiple times in student explanations of what they especially liked in the project. One student made the connection between the theme of freedom in the topic of study, colonial America, and the experience of freedom in the project, stating that “I like the freedom of this project. It’s crazy we were learning about freedom while
### Table 2

**Student Feedback Responses**

#### PERSONALIZATION QUESTIONS (N = 81)

|                                           | Not at all | Only a little bit | Yes, kind of | A lot |
|------------------------------------------|------------|------------------|--------------|-------|
| Decision-making in topic                 | 0          | 0                | 18           | 63    |
| Decision-making in how to work           | 0          | 0                | 18           | 63    |
| Decision-making in product               | 0          | 1                | 15           | 65    |
| Active role in designing learning        | 0          | 4                | 21           | 56    |
| Owner of my work                         | 0          | 1                | 7            | 73    |
| Purposeful work                          | 0          | 2                | 34           | 45    |

#### INSTRUCTIONAL SCAFFOLDING QUESTIONS (N = 79)

|                                           | Not at all useful | A little useful | Kind of useful | Very useful |
|------------------------------------------|-------------------|-----------------|----------------|-------------|
| Usefulness of scaffolding tools          | 1                 | 6               | 21             | 51          |
| Amount of support                        |                   |                 |                |             |
| Confusing (Didn’t know what to do)       | 1                 |                 | 1              | 77          |
| Kind of confusing (Sometimes didn’t know what to do) | 3 | 39 | 37 |
getting it. We normally never do that in school.” In addition, many students asserted that they felt that they were allowed to do “whatever we wanted,” which is interesting given the considerable scaffolding that was used throughout the project. This suggests that for these students, the scaffolding did not impact their overall sense of freedom within this project.

As it concerned the perceived benefits of choice and freedom, many students shared that they especially appreciated the opportunity to “research what I wanted” because this allowed them to explore “something that was interesting to me.” For example, one student wrote, “One thing I especially liked about the colonialism project was that I wasn’t just forced to research one topic. I was able to follow my heart and research something I wanted to research.” Students also reported that they felt the choices they made led to important learning connected to topics of interest to them. For example, one student reported, “I really learned a lot of things that I didn’t know before about the lives of slaves in colonial America,” while another wrote “I really liked being able to learn about colonial women, since I don’t know if they were a big enough part of history for us to learn about them otherwise.”

Learners Reported a Sense of Control and Independence in Their Project. Many students also reported that they appreciated the opportunity to have “control” throughout the project, at times contrasting this with other classroom experiences they had that were more teacher-directed. For example, one student stated, “I liked that we got to pick the question that we studied, so I could work on something I wanted to work on, instead of something some teacher wanted us to work on.” One student even went so far as to suggest that not being “forced to do something one way” had helped them learn:

I liked that my classmates and I had the chance to be the real us. In other grades you were forced to do something one way, and it was harder to learn that way. The way we are learn[ing] in this class helps me learn.

Students also shared that they appreciated the opportunity to be independent in their learning, reporting that they liked “how I got independence to do my own thing” and “that it was a project that we got to do on our own with minimal help from the teacher.” One student liked that “I was teaching my self [sic].” As was the case with those students who reported feeling a sense of freedom, this reported perception of independence and control is further evidence that for these students, the scaffolding tools used to co-design the projects did not negatively impact their sense of autonomy.

Learners Especially Enjoyed Creating and Sharing a Unique Final Product. For some students, the aspect of the project they reported especially liking was the creation of their final product. Some of these responses pointed to an appreciation for the opportunity to make something unique. For example, one student shared, “I liked the ability to create something that was different from anyone else’s” while another student shared, “One of the things I really liked about this project is the chance we were given to do anything we want to present the information we’ve been gathering to answer our own questions.” For other students, the creation of the final product was an opportunity to make meaningful connections with their talents. One student reported that this served as a motivator for them, stating: “I liked the ability to create whatever product I wanted. This made me interested and made me really push to use a lot of my talents.” Similarly, another student shared how they appreciated being able to “use my own talents to create a piece of artwork that meant something to me.”

Sharing their final product with an audience was also identified by students as an important and enjoyable aspect of the project. Several students reported especially liking the opportunity to share their work by “telling people things I learned.” One student wrote, for example, “Something that I liked about the project is it was fun to present and share my work with other people,” while another student simply liked “that we got to present in the end.” For one student, the authentic sharing day was also an opportunity to learn about their peers: “[O]ne thing I liked about the project is that everyone got a chance to really express themselves through the artwork that they created and it really helped me learn more about my fellow peers.”

Aim 2: Instructional Scaffolding
Throughout the hands-joined learning project, learners were provided with significant opportunities for instructional scaffolding. The instructional scaffolding used in each phase of the project is summarized in Table 1, and we have summarized student feedback on the Likert scale questions related to instructional scaffolding in Table 2. While learners
had mostly positive responses regarding the instructional scaffolding, there was some variation in the responses. All but two learners indicated that they felt the teacher provided “the right amount of support” while they were working on the project. Most learners also found the planning tools to be “kind of useful” or “very useful” with a few students indicating that they found them to be “a little useful” and one student indicating that they found them to be “not at all useful.” A closer look at the responses of the students who rated the planning tools as “a little useful” or “not at all useful” offered some insight into their concern. For some students, the planning tools felt cumbersome and disruptive. One student described them as “really tedious” and another recommended that next time they would like “not as much co-planning tools because sometimes it got in the way of working on my actual project.” In suggesting areas for improvement, one student simply stated “no more planning tools.” One of these students was also the student who indicated that there was “too much support,” which we infer may have been connected to the student’s displeasure with the planning tools.

Learner responses were also positive, but comparatively more variable, regarding the clarity of the project. Thirty-nine students indicated they “usually knew” what they needed to do and thirty-seven indicated that they “always felt like I knew” what to do. Three students selected the option: “The project was kind of confusing. Sometimes I didn’t know what I was doing or why.” One of these students suggested that the project would be clearer if there was not “so much stuff to submit in the process,” again alluding to the planning tools as somewhat confusing. The other two students made no suggestions for improvement.

Overall, these results indicate that learners found the instructional scaffolding to be appropriate for the project. An exploration of student responses that were less favorable, however, also provides some evidence that the planning tools may need to be reconfigured to be less cumbersome so as to minimize the risk of this instructional scaffold being disruptive to, rather than supportive of, student learning.

Some Learners Craved More Personalization in the Learning Process. We identified several contradictions in our analysis of students’ open-ended responses. While some students reported the desire to have “more freedom,” others shared that they craved more support. For example, one student suggested that the project could be improved by offering “complete freedom.” In response to the same question, however, another student shared “I want more of a schedule. More than first draft due, and final project due. It would help me manage my time better.” Similarly, while some students shared that they wanted it to be “a little more clear about what needs to be done in terms of assignments,” several others stated that they wanted less structured assignments, requesting “less graphic organizers” and “not as much co-planning tools.” And lastly, while students reported enjoying the “independence” of creating their projects and the opportunity to create something different from their peers, several students also reported craving the opportunity to work with partners or peer groups suggesting, for example, that “we should be able to work with peers a bit more if our projects relate.” These contradictions in student experiences and needs should not be surprising given the research base on learner variability, which is a primary driver for the personalized learning movement. This finding, however, serves as a reminder of the critical importance of personalizing not only what students learn (content) and what they create (product), but also how they learn (the learning process).

Discussion and Implications

The aim of this study was to investigate a proposed framework, hands-joined learning, as an approach to personalize project-based learning while providing ample instructional scaffolding. In the following section, we discuss the findings and offer several theoretical and practical implications, including suggestions for future research in this area.

Hands-Joined Learning Offers a Promising Framework for Personalizing Project-Based Learning

The results of the student feedback survey indicate that the vast majority of learners responded positively in relation to the two aims of the hands-joined learning experience: personalization and instructional scaffolding. This supports the notion that project-based learning can offer opportunities for personalization through approaches such as hands-joined learning. In addition, our findings indicate that despite the considerable scaffolding, learners reported an overall appreciation for the amount of choice, freedom, independence, and control they had within the learning experience. This suggests that the emphasis on scaffolding did not eclipse the commitment to student voice in
hands-joined learning. Despite the known issue that choice can be challenging for students (Brockett, 2006; Morrison, 2008), students reported that choice was an enjoyable aspect of the project, which suggests that the scaffolding may have helped students navigate through the perils of choice-making. In total, these findings indicate that hands-joined learning offers a promising framework for classroom teachers who are seeking to personalize learning within a project-based framework while also offering adequate scaffolding to a range of learners.

The learner responses to open-ended prompts also reveal a few interesting blind spots in the design and implementation of this particular project, which point to some valuable lessons for others engaged in personalized learning research and teaching.

**Instructional Scaffolding Should Be Personalized**

The finding that students craved more personalization of the learning process reveals that in the design of this experience, greater emphasis was given to personalizing the content and product and that the approach to scaffolding did not allow for adequate personalization of the learning process. This reveals a problematic assumption: while personalization called for significant choice in what students chose to research and create, it did not call for similar personalization of the learning process. This ultimately resulted in students feeling compelled to complete the project in a relatively uniform manner. The student feedback, however, provided a striking reminder for teachers to not overlook the importance of opportunities for learners to take an active role in making decisions in the “how” of their learning. While the co-planning graphic organizer was designed to provide structure and support as students navigated the multiple decisions they could make throughout the project, there is also some evidence in our findings that this may have been disruptive to student learning and, in some cases, unnecessarily cumbersome. We posit that offering opportunities for learners to make choices within the scaffolding process (e.g., which research tools to use, which graphic organizers to use, and whether to work with a peer or individually) would further amplify student perceptions of playing an active role within the hands-joined learning experience. As a result of our findings, we are also increasingly aware that individual students may need and want different amounts and types of instructional scaffolding. As such, personalizing instruction for the individual learner also necessitates personalizing the instructional scaffolding.

**Personalized Learning Should Balance Individual Inquiry and Peer Collaboration**

Another valuable lesson can be learned from student feedback concerning the need for peer collaboration. This study’s focus on personalization highlighted the relationship between young adolescents’ motivation and their need for autonomy (Eccles & Wigfield, 1997). However, the significant social needs of young adolescent learners to connect with peers are also well-documented in developmental theory (Caskey & Anfara, 2007) and foundational to middle school philosophy (NMSA, 2010). The omission of substantive opportunities for peer collaboration with this hands-joined learning experience, therefore, was a significant oversight and an illustration of the potential bias toward individual inquiry within personalized learning environments. The student feedback is thus an important reminder of the critical importance for teachers to provide young adolescent learners with opportunities to meaningfully connect with other members of their learning community and that the failure to do so may impact the developmental appropriateness of personalized learning experiences for young adolescent learners. Additionally, we recognize that carefully structured peer collaboration can also serve as instructional scaffolding and, as such, may serve the dual purpose of supporting students in navigating their personalized learning projects. For these reasons, we recommend that careful attention should be given to strategically structuring meaningful opportunities for collaborative learning within personalized experiences such as hands-joined learning.

**Limitations and Future Directions for Research**

The findings from this study point to several interesting areas for future research, five of which we offer here. First, this study provides empirical support for the claim that PBL can offer opportunities for personalization through approaches such as hands-joined learning. Because this study was limited to one teacher in one classroom, however, we wonder if the findings would be similar in different classrooms, schools, and content areas. A study using approaches such as cross-case analysis could be especially helpful in understanding the utility of hands-joined learning as an approach to personalization. Second, since this study had a limited focus on hands-joined learning, we recommend further research into other
ways to personalize instruction through project-based learning and other learner-centered pedagogies (e.g., service-learning, problem-based learning, and community-based learning). Third, since this study was limited to investigating the personalization and instructional scaffolding aspects of hands-joined learning, we are aware that this does not directly address student learning outcomes. While project-based learning has been associated with positive learning outcomes (Blumenfeld et al., 1991; Darling-Hammond, 2008; Thomas, 2000), we wonder what impact the amplification of personalization through hands-joined learning may have on learning outcomes. For example, does increased personalization in PBL lead to deeper learning? In addition, we wonder what other outcomes may be associated with projects that use hands-joined learning as a result of the increased personalization. For example, do students who engage in hands-joined learning also develop self-directed learning skills? Fourth, we recommend further research investigating the mechanisms by which teachers can personalize instructional scaffolding within personalized learning approaches such as hands-joined learning. In other words, how can teachers engage students in making decisions about the amount and types of instructional scaffolding they need? What outcomes are associated with this personalized approach to instructional scaffolding? Finally, because this study has demonstrated the need for meaningful peer interaction within personalized learning environments, we recommend further research investigating how teachers can support students in making meaningful decisions in their personal learning while also providing ample opportunities for middle grades learners to interact socially and collaborate with peers.

**Conclusion**

The framework for hands-joined learning projects was developed to illustrate a way that teachers can personalize instruction through project-based learning while also providing appropriate instructional scaffolding. Student feedback suggests that this hands-joined learning project was largely successful in achieving these goals, offering empirical support for the assertion that project-based learning is a promising pedagogy for personalized learning (Bishop et al., 2019). Furthermore, the findings suggest that the hands-joined learning framework can help teachers navigate the delicate balance between student-directed and teacher-directed learning as they seek to deepen personalization for students while also providing appropriate scaffolding and support. As such, our hope is that this study and the hands-joined learning framework might invite more teachers to experiment with personalized learning through project-based learning.

While student feedback on their experience with the hands-joined learning project was largely encouraging, it also provided insight into areas in which the hands-joined learning framework can be improved. Student feedback revealed, for example, the need for instructional scaffolding to be personalized and for personalized learning environments to include meaningful learning opportunities for peer collaboration. This affirms our belief that, in the pursuit of developing innovative teaching approaches that purport to have specific benefits for students, exploring learner perceptions is of immeasurable value. As educators seek to co-design curriculum with learners, education researchers must co-examine these learning experiences with young people in ways that honor the vital role their perceptions play in the learning endeavor.

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Appendix
Hands Joined Project Student Feedback Survey

Personalization
How much do you agree with the following statements about the Colonialism project?\(^2\)
Response options for 1–6 were a) Not at all, b) Only a little bit, c) Yes, kind of, d) A lot

1. In the Colonialism project, I was given a chance to make meaningful decisions about what topic I wanted to focus my project on.
2. In the Colonialism project, I was given a chance to make meaningful decisions about how to work on my project.
3. In the Colonialism project, I was given a chance to make important decisions about what to create for my final product.
4. In the Colonialism project, I felt like I had an active role in designing my own learning.
5. In the Colonialism project, I felt like I was the owner of my work.
6. Working on the Colonialism project felt like purposeful/meaningful work.

Scaffolding
Options for #7-8: a) Not at all useful, b) A little useful, c) Kind of useful, and d) Very useful

7. In the Colonialism project, there were many planning tools (ex. the inquiry question brainstorm, the co-planning tool, the annotated bibliography note-taking sheet, graphic organizers). How useful were these tools in helping you to make progress with your Colonialism project?
8. How would you rate the amount of support that you received from your teacher throughout this project?
9. How well do you feel you understood what was going on in the Colonialism project?
a. The project was confusing. I didn’t know what I was doing or why.
b. The project was kind of confusing. Sometimes I didn’t know what I was doing or why.
c. The project was pretty straight-forward. I usually knew what I needed to do.
d. The project was very straight-forward. I always felt like I knew what I needed to do.

Open-Ended Questions
10. What is one thing you especially liked about the Colonialism project?
11. What is one idea you have for making the Colonialism project better?

\(^2\) Classroom name for this specific hands-joined learning project.