

Integrating a Newly Developed Mobile Application in MCH Education

ATMCH Innovative Teaching Award in MCH

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Background

Maternal and Child Health (MCH) is one of the broadest and important areas in public health. MCH populations face enormous health disparities resulting in poor outcomes. Indicators such as teen pregnancies, poor prenatal care, maternal/infant mortality, and others repeatedly demonstrate unacceptably high rates among disadvantaged populations. U.S. public health professionals seeking to improve outcomes face many challenges including increasing diversity of MCH populations, rapidly changing health care environment, and significant workforce changes due to program downsizing, budget constraints, and retirements.¹ The number of workers in the U.S. public health system, including those trained in MCH, is declining.²⁻³ The need for MCH training among current and future public health workers is well documented.^{1,4-6}

Increasing diversity among MCH populations reflects the U.S. population. According to 2014 estimates, 12.6% of the U.S. population is Black and 16.9% identify as Hispanic.⁷ Furthermore, Asian, Pacific Islander, and Hispanic populations are increasing.⁸ Children and young adults to age 19 years comprise 26.3% of the population and reflect even greater diversity as 15% are Black and 21% are Hispanic.⁹ It is estimated 20.9% of the U.S. population speaks a language other than English of whom, 41.2% speak English “less than very well.”⁷ Almost 5% of U.S. households are linguistically isolated (no one > 14 speaks English “very well”).¹⁰

In order to best serve diverse MCH populations, the Maternal and Child Health Bureau (MCHB) of the Health Resource and Service Administration (HRSA), set forth goals enhancing multiple MCH competencies including cultural and linguistic competency of the MCH workforce and trainees. The vision of the MCHB includes eliminating all health disparities. This aligns with the Healthy People 2020 overarching goal to “achieve health equity, eliminate

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ATMCH Innovative Teaching Award in MCH

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disparities, and improve the health of all groups.”¹¹ Goal 2 of the HRSA Division of MCH Workforce Development 2012-2020 Strategic Plan focuses specifically on preparing a MCH workforce to promote health equity and reduce health disparities. A key strategy related to this goal is supporting training programs incorporating the scope of MCH competencies such as cultural/linguistic competence in curricula, research, learning, and practice environments.¹²

Incorporating activities related to cultural competence is vital for MCH training programs and should be integrated into all aspects of MCH training. Developing curricula with one elective course is not sufficient as it is often not required and students have limited time/credits.

One method to integrate educational activities throughout a curriculum is via use of technology. The successful use of smart phones and mobile applications is described in research, clinical work, and patient education efforts,^{13,14} but little is published using technology in MCH classroom education. One project, (not MCH), describes an online application enhancing collaborative student learning in a medical pathology course,¹⁵ with high student satisfaction.

Since the inception of online learning, Drexel has been at the forefront of technology enhanced education. Drexel has over 140 fully online programs with a comprehensive support system. Drexel was recently recognized by the Online Learning Consortium (2010) for excellence in institution-wide online education and by U.S. News and World Report (2015) as one of the most innovative universities in the U.S.¹⁶ As a newly funded MCH Public Health Catalyst Program Grantee (<http://mchb.hrsa.gov/training/catalyst-program.asp>), the MCH Program at Drexel University Dornsife School of Public Health (SPH) seeks to enhance public

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ATMCH Innovative Teaching Award in MCH

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Drexel University Dornsife School of Public Health

health training in MCH competencies, including cultural and linguistic competency, through an innovative educational offering using a newly developed mobile application.

Significance of Topic to MCH Education

Integrating the 12 MCH Leadership Competencies into MCH curricula is integral for MCH program development. The MCH Navigator Website of Georgetown University contains a self-assessment for professionals and students interested in learning more about the competencies (<http://www.mchnavigator.org/assessment/>). This assessment allows users to identify strengths and weaknesses related to the 12 competencies, match learning needs to trainings available, and create an individualized learning path.

Cultural and linguistic competency is a high priority within the MCHB. The National Center for Cultural Competence (NCCC) creates resources related to cultural/ linguistic competence and the elimination of health disparities. The NCCC is a collaborator on the Drexel MCH Catalyst Grant. Recently, NCCC surveyed MCH Training Programs regarding interests and training needs and findings indicated a need for instructional materials, curricula, model programs, and multimedia products specific to cultural/linguistic competency training. An online module series was developed to enhance cultural/linguistic competence training.¹⁷ This series can be used to increase student/faculty capacity in cultural/linguistic competency.

The NCCC module series¹⁷ website and NCCC brief⁹ review the impetus and “how to” incorporate cultural/linguistic competence into MCH education. Reasons include: training future workforce to understand issues related to racism, disparities, diverse belief systems; and demographic changes; most curricula do not fully incorporate cultural competency training to

Integrating a Newly Developed Mobile Application in MCH Education

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prepare students/faculty to practice in multicultural environments; to prepare students/faculty to eliminate disparities and improve quality/access of health services for all MCH populations.

To effectively train students in cultural/linguistic competency, related learning activities can be incorporated into MCH curricula via the novel use of technology. This benefits students in the classroom and brings MCH to the forefront by integrating up to date technologies used successfully in other areas to MCH education. Three-quarters of the world's population accesses mobile phone with increasingly powerful technical capacities.¹⁸ Technology in health care improves service delivery and impacts patient outcomes.¹⁹ Utilizing technology (mobile applications) may increase efficiency among the overburdened MCH workforce.

Proposed Outline of Educational Offering

The purpose of this project was to develop a mobile application to be used as part of the field experience requirement of the Introduction to MCH course (which will be required for all MCH students as a formal MCH certificate/concentration program is developed). A primary goal of the application was fostering collaborative learning related to MCH field experiences, MCH competencies, access to resources and streamlined collection of information related to MCH field experiences and requirements, and cultural and linguistic competency. The “app” was piloted in the Intro MCH course, but it is planned to expand its use in other MCH courses/concentration as they are developed. We are also exploring ways to modify the app to be used in other student activities possibly across the larger MPH program

The introductory course is an overview of MCH topics including: history, life course, policy, women's/adolescent health, epidemiology, environmental health, global health, and

Integrating a Newly Developed Mobile Application in MCH Education

ATMCH Innovative Teaching Award in MCH

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Drexel University Dornsife School of Public Health

children with special needs. This winter quarter course (Jan-March) includes didactic sessions and small groups. Students are required to complete a journal reflecting on weekly topics and a field experience. Ten of the 12 MCH Leadership Competencies are partially addressed.

The innovation of this project is the use of a mobile application “app”, developed by the Drexel Online team in MCH classroom education. The “app” was to promote collaborative learning among students related to MCH competency, and more specifically cultural/linguistic competency, activities and experiences. Proposed activities included student responses to cultural competency case studies (NCCC module training series), links and reflection on the NCCC cultural competency self-assessment tools, and student reflections at field experience sites. A share site would be created to allow students to share reflections with peers and instructors. Peers/instructors would then be able to comment on entries increasing collaborative learning.

It was planned that the app would include a video tutorial built directly into it to provide students a general "how to use" the app for completing specific course requirements, and how to produce, post, and respond to student videos and collaborative assignments. Similarly, an instructor training webinar was planned to be built into the app to provide instructors with a “how to use” the app for monitoring/reviewing student progress and assignment submissions.

Evaluation of the app was to be based on the following criteria:

- Relevance: App focus has a strong connection to app purpose & is appropriate for student
- Engagement: Student is highly motivated to use the app
- User Friendly Instructions: App is easy to learn/use, directions are clear/simple to follow
- Sharing: Specific performance summary or student product is saved in app and can be exported to the teacher or for a broader audience
- Feedback: Student is provided specific feedback
- Customization: App offers flexibility to alter content and settings to meet student needs

Integrating a Newly Developed Mobile Application in MCH Education

ATMCH Innovative Teaching Award in MCH

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Drexel University Dornsife School of Public Health

Implementation and Evaluation

App Development

Smart phones are the entry devices to the online world for a large number of Americans.²⁰ For college students, the growing use of mobile suggests the future of learning activities, research, and student to faculty communication, will rely heavily on mobile technology.²¹ As a result, the Google Play Store has doubled in the amount of apps since 2014,²² with eight percent of the applications falling under the category of education, which is the largest. Clearly there is a trend in the direction of educational apps, which drove the team's thinking on enhancing the material child health (MCH) field study student experience.

The application development process first consisted of conducting a needs assessment (discovery phase) with key stakeholders. Students were asked in face-to-face conversations what features they would likely use in an MCP mobile app. Those answers were recorded and sent to the development team. In addition to student feature requests, the team interviewed the course instructor to understand faculty needs. Both data sets were compiled into a requirements document, which set the stage for conducting a technology assessment of the marketplace.

Integrating a Newly Developed Mobile Application in MCH Education

ATMCH Innovative Teaching Award in MCH

R Turchi, R Lum, J Rodriguez, and S Sutcliffe, R Davis

Drexel University Dornsife School of Public Health

All members of the development team conducted research on current marketplace products designed for rapid app development. When conducting research on the creation of mobile apps, it is critical to understand the difference between native app and web app. A native app is designed for a specific platform, such as IOS or Android. This development method allows the app to interact with the operating system in a seamless way. A web app is a mobile optimized webpage(s), which gives users the feel of a native app. In essence, a web app is a website. The research team reviewed cloud-based native app products such as Conduit, Ibuild App, Appy Pie, and Good Barber, which provide drag and drop tools and pre-loaded templates to rapidly prototype mobile apps. These products require a monthly subscription and a fee to submit to the app store. The research team found the products to be beneficial for rapid development of a prototype, but limiting in the pre-built tools.

Wordpress and Drupal were reviewed for mobile app development. The team had previous experience using the two systems to create web apps. The systems are open source and have large user communities. For example, Wordpress boasts 50,000 plugins that can be used to expand the core of wordpress's capabilities. This can be particularly useful when there are multiple requirements for a web-based project. The development personnel on this project built two native apps using the software mentioned earlier in this section, and a web app using Wordpress.

Integrating a Newly Developed Mobile Application in MCH Education

ATMCH Innovative Teaching Award in MCH

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Drexel University Dornsife School of Public Health

The two native apps were extremely easy to build using the cloud-based software. In both cases, the developers used the systems' pre-built tools and templates. This allowed for the creation of an app within 24 hours. Using the cloud-based services, the team was not able to meet the tool requirements for this project, which was a major drawback. In contrast, the web app allowed us to meet the requirements. The web app involved purchasing a domain name and web hosting from a company, and using Godaddy's app installer to quickly setup Wordpress. That process took only one hour. Next, the team bought a mobile ready theme (WP Touch) to install in our Wordpress instance. The theme converts the website to mobile if, as a user, you are viewing from a mobile device. The team then researched plugins to provide the functionality for form building and social communication. An additional perk to creating a web app is that you have a desktop experience. After a week of testing, as mentioned, the team opted to use Wordpress to create a web app, which allowed us to meet all of the student and faculty requirements.

The expectation was to have recorded on-demand training videos, but due to time considerations the team opted for in-class training.

Implementation

Integrating a Newly Developed Mobile Application in MCH Education

ATMCH Innovative Teaching Award in MCH

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Drexel University Dornsife School of Public Health

The app was introduced to students in the Introductory MCH course for 2 weeks beginning March 1, 2016 (weeks 9 and 10 of the course). There were 12 public health students in the class (11 MPH, 1 DrPH, and 1 MD/MPH degree program) and all were 2nd year students with the exception of the doctoral student who was in her 5th (final) year. Two students were of Hispanic ethnicity (17%) and 9 (75%) self-identified as racial minorities. All students used the app during their field experiences. Field experience sites included a government public health program, community agencies, hospital, and other clinical sites. Students were provided with a brief overview of app functions by course instructors when the app was first introduced. However, a training tutorial/webinar within the app as proposed was not completed due to the time limitations described above. All students were required to complete the field experience checklist, site confirmation form, and feedback survey. The share feature and additional resources related to cultural competency were optional due to time constraints. Since the app was not introduced until week 9 of the course (course is run on the Quarter system and is only 10 weeks in length), the students were not able to use the MCH Navigator Self-Assessment via the app. This assessment was completed online earlier in the course before the app was available.

Integrating a Newly Developed Mobile Application in MCH Education

ATMCH Innovative Teaching Award in MCH

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Findings

All 12 students completed the feedback survey within the app. Sixty (60) percent of students reported the app helped them to conduct their field experience in a more efficient way and more than 80% reported the app made it easier to complete the course work related to the field experience. Seventy (70) percent of students reported the app met their expectations and only 2 students (16%) experienced minor technical problems. Overall, 75% of students reported they were satisfied with the app experience and 70% reported they would use the app again.

Table 1 shows the ease of use and usefulness of the app features as reported by students. Specifically, students reported the guiding questions within the checklist were helpful in preparing for field experiences. With respect to the Share feature, students reported a lack of awareness and understanding of this feature. One student commented, “I like the idea of the share feature of the app but I think students need to be more aware of it and encouraged to use it...I like the fact that you can comment and interact with each other.” Similarly, student comments reflected the need for more awareness of the Resources feature. Another student commented, “I didn’t feel that I needed to [use the Resource feature], however after this survey I am more interested in going back and spending more time on this feature of the app. I think it would be good to spend more time educating students on the components of the app.”

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ATMCH Innovative Teaching Award in MCH

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Drexel University Dornsife School of Public Health

Table 1: Ease of Use and Usefulness of App Features

App Feature	Ease of Use (%)	Usefulness (%)
Checklist	80	90
Site Confirmation Form	70	75
Share	30	50
Resources	30	60
Feedback	60	70
MCH Navigator	N/A	N/A

Most students (75%) reported not using the Share feature at all. Reasons given included not knowing how to use it (67%), had nothing to share or not interested (44%), and not enough time (11%) (students were able to choose multiple reasons). Of the 7 students who reported not using the Resources feature, nearly 60% cited not having enough time as the reason.

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ATMCH Innovative Teaching Award in MCH

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With respect to the use of the app versus the desktop companion website, 40% of students reported using only the app and 10% reported using only the companion website. Of the 50% that used both, use between the two was about equal. One student commented, “I think the website was easier [to use]. I always find it easier to type on the computer. However, I used the app more because it is mobile and I could review the questions right at the [field experience site] without having my computer up.” Students were split as to which method was easier to use with 50% reporting the app was easier and 50% reporting the desktop version was easier (note 2 students skipped this question). Students found the app most useful *during* the field experience. This was followed by *after* the site visit and then *before* the site visit (preparation). In contrast, students found the companion website most useful *after* the site visit. This was followed by *before* the visit (preparation) and then *during* the visit.

Discussion

Throughout this project there were several “lessons learned.” It is clear that integrating the app into the course from the beginning would allow more time for students and instructors to fully utilize the functions of the app. The need for orientation to the app is also clear. This is true from both the student and instructor perspectives. In the future, this can be done via the training webinars/tutorials that were originally proposed to be built directly into the app. Beyond this

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ATMCH Innovative Teaching Award in MCH

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initial training, the project team also believes additional training specific to the Share feature of the app would be warranted. Students reported not using this feature not only because they did not know how, but also because they did not fully understand the feature. Further training related to sharing information in a professional manner with peers and colleagues will be explored by the project team.

With regard to the design of the app, the project team struggled with the importance of visual appeal of the app vs functionality. Due to time limitations, a more functional dashboard design was chosen in lieu of a more visually appealing design. It is not clear if this impacted the use of the app by students and this will be explored further.

Although not in the original proposal, the development of a companion website for the app was found to be useful to students. We found that students used the website most often *after* the field visit as opposed to the app which they used most *during* the visit. The website appears to be a useful feature for students who would like the option of editing their work on a desktop or a device with a larger screen than perhaps a mobile device on which they would use the app.

Integrating a Newly Developed Mobile Application in MCH Education

ATMCH Innovative Teaching Award in MCH

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With respect to the features of the app, it was clear students liked the structured learning provided by the Field Visit Checklist. The guiding questions helped students better prepare for the field visits. The use of the Share and Resource features were very limited during this pilot study. This is likely due to the time constraints and lack of a full orientation/training on all the apps features. As such, student to content engagement benefited students using the app much more than student to student or student to instructor engagement. We plan to continue to utilize the Share feature in the future along with additional training as described above to promote its use for collaborative learning among students. We are also looking into the option of allowing the app as a whole, but specifically this Share feature, to be used by community professionals working with our students such as field visit site preceptors and eventually MCH community research project preceptors. This would further enhance MCH collaborative learning among students, faculty, and professionals.

We also plan to continue to enhance the Resource feature and ensure this is reviewed in initial training sessions. In addition to MCH Competency-related resources, we plan to look into adding other course-related resources and materials, School-wide MCH activity announcements such as MCH Journal Clubs, Speaker Series, etc. and eventually MCH program resources for students in the MCH certificate/concentration programs. As we develop the MCH programs further we will aim to use this app and companion website across all MCH courses.

Ways Project can be Shared

Interested institutions can learn more about this project via this report and the supplemental material provided. These materials include the link to the companion website

Integrating a Newly Developed Mobile Application in MCH Education

ATMCH Innovative Teaching Award in MCH

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(www.mchapp.com), a video of one of our students discussing the app (which can be viewed at the 7:04-10:11 markers at the following link:

<http://videos.webpatientencounter.com/annotatevideoV2.aspx?a=741> and is also available on the companion website), and a poster related to the app development which includes screen shots of the app. The project team presented this project at the Drexel E-Learning Conference and Collaboratory in April 2016 and the Drexel 4th Annual Showcase of Teaching in May 2016. The team will also present a poster at the Quality Matters National Conference in Portland, Oregon later this year.

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ATMCH Innovative Teaching Award in MCH

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Drexel University Dornsife School of Public Health

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