

**Title:**

Campus-Based Health Information Campaign Using Bluetooth 4.0 Low Energy Device (iBeacons)

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Bluetooth Low Energy Device, KAP and iBeacons

**References:**

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#### **Abstract Summary:**

Technological development has greatly impacted the manner in which health services are rendered. In this inquiry, we looked at the potential of Bluetooth low energy (iBeacons) as a tool for health information dissemination. Furthermore, we offer implication on the use of iBeacons in education, research, and practice.

#### **Learning Activity:**

<b>LEARNING OBJECTIVES</b>	<b>EXPANDED CONTENT OUTLINE</b>
The learner will be able to recognize the effectiveness of a Bluetooth 4.0 low energy device (iBeacons) in disseminating health information that directly affects the respondent's knowledge, attitudes and behavior towards the health issue.	Presentation of the respondent's pre and post test statistical results and its discussions.
The learners will be able to differentiate the effects of utilizing leaflets (control group) and iBeacons (experimental group) in propagating health information.	Presentation regarding the comparison of the results of the control and experimental group.
The learners will be able to identify a new tool that integrates new technology in the health care practice.	Provide a concise background knowledge about iBeacons through use of appropriate journals and literature reviews. Findings of the study will be discussed as it relates to education, practice, and research.

#### **Abstract Text:**

#### **Introduction**

The use of Information and Communications Technology in health, or "eHealth" is considered globally as an important tool in delivering healthcare services for its innovative impact on health outcomes, both in highly industrialized, and developing countries (Macabasag, Magtubo, & Marcelo, 2016; Blaya, Fraser, & Holt, 2010; Ngwenyama, Andoh-Baidoo, Ballou, & Morawczynski, 2006; Gaved & Anderson, 2006). Incorporating technology makes healthcare and health education efficient and accessible (Siritongthaworn, Krairit, Dimmit, & Paul, 2006). Of special note is the of the emerging technology called "iBeacons", which has the capacity to disseminate information electronically through the use of Bluetooth technology (Newman, 2014; Koühne & Sieck, 2014, November). These transmitting devices are using specifically the technology of Bluetooth low energy (BLE). Although it is a product produced by Apple, iBeacons is also compatible with different platforms such as Android.

Scholars are now starting to recognize the use of iBeacons. For instance, He, Cui, Zhou, & Yokoi (2015, July) studied the design interaction system between museum hall collections and visitors. In terms of localization, Lin et al. (2015, August) tested the use of iBeacons in locating the position of patients in an emergency room. The present literature analyzed iBeacons in terms of localization and positioning function (e.g. Gast, 2014; Oscar, 2014, May; Varsamou & Antonakopoulos, 2014, September), however, to our knowledge, there is a dearth of studies related to iBeacons' ability to disseminate health information.

## **Aim**

To test the effect of iBeacons in improving knowledge, attitudes, and practices (KAP)

## **Methodology**

We utilized a quasi-experimental, pretest-posttest approach to ascertain the effect of iBeacons on the respondents' KAP. The two experimental groups received the health information through iBeacons and pamphlets respectively, while the control group received no intervention. The respondents are nursing students in a higher educational institution (HEI) in Metro Manila. The respondents were purposively selected, since the current version of the iBeacons we utilized is only compatible to Apple iOS. The health information focused on Zika Virus Infection. We created a 10-item multiple-choice quiz to test the respondents' pretest and posttest knowledge. The quiz was validated by a nursing professor who teaches communicable and infectious diseases nursing. We adopted the World Health Organization questionnaire to assess Attitudes and Practices regarding Zika Virus Infection. The questionnaire was modified to fit the objectives of the study. Content validity was established after evaluation from three senior nursing professors from the said HEI. Cronbach's alpha for 21 Attitudes and 17 Practices items were 0.944 and 0.952, respectively.

## **Results and Discussion**

Over a four-week period, improvements had been observed in the knowledge, attitudes, and practices (KAP) scores. For the pamphlet group presented improved posttest knowledge scores as compared with the pretest results ( $t = -5.272$ ,  $p < 0.001$ ). Likewise, the iBeacons group showed increased posttest result, when compared to their pretest  $t(19) = -6.371$ ,  $p < 0.001$ . In contrast, the control group shows no significant improvement in their posttest results ( $t = -0.271$ ,  $p = 0.789$ ). The Attitude scores for the pamphlet and iBeacons group suggest similar results with their Knowledge scores. Both the posttest scores suggested significant improvement, as compared with their pretest ( $t = -2.823$ ,  $p > 0.007$ ;  $t = -2.912$ ,  $p > 0.005$ ). In the same way, the results of Practice scores suggested significant increase in the posttest ( $t = -2.912$ ,  $p < 0.005$ ;  $t = -2.235$ ,  $p < 0.03$ ). One-way ANOVA suggested that there is a significant difference exists between the interventions when examined through attitude scores ( $F(2,57) = 5.472$ ,  $p = 0.007$ ) and practice scores, ( $F(2,57) = 4.466$ ,  $p = 0.016$ ). Tukey's Post Hoc Analysis revealed that differences in attitudes scores of iBeacons group ( $M = 3.18$ ,  $SD = 0.39$ ) and pamphlet group ( $M = 3.10$ ,  $SD = 0.43$ ),  $p = 0.783$  were not statistically different. Multiple comparisons test also showed that no significant difference in the practice scores between iBeacons group ( $M = 3.46$ ,  $SD = 0.44$ ) and pamphlet group, ( $M = 3.38$ ,  $SD = 0.50$ ),  $p = 0.863$ ). The use of iBeacons is put forward as a potential tool for improving the delivery of health information to the public.