**Activity 2 Worksheet: Background/Contextualizing Research**

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| Project Title | Practical Implementation of Diabetes Technology:  Real-World Use |
| Project Type *(Choose either 1, 2 or 3)* | Practical implementation of a system or technology |

Note: There are two questions A and B that you need to answer. Please save this file using the following naming standard. {your name} {course name} {assignment number}, for e.g. John\_Project\_Foundation\_Assignment\_2

Full Marks: 10

A. Students are required to refer to three (3) scholarly publications related to their proposal topic and summarize each paper as described in the table. This means you need to make three tables describing all the details of the paper related to your proposal topic.

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| **Title (1)** | **What is the title of the paper?**  Practical Implementation of Diabetes Technology: Real-World Use  **Does it have the keywords that you are searching for?**  Yes, it has the keyword that I was searching for the paper. |
| **Author** | **Who is the lead author and co-author**?  Laurel H. Messer and Stuart A. Weinzimer.  **Which organizations or institutions they belong to?**  Tandem Diabetes, Insulet Corporation, Eli Lilly and Company, Sanofi, and Zealand Pharma, Medtronic Minimed, DexCom Inc., Clinical Sensors and Capillary Biomedical.  **Are these organization or institutions reputable? Search for it in their websites.**  Yes. |
| **Publication Type** | **Is this paper published in a journal or a conference proceeding, magazine etc.?**  DIABETES TECHNOLOGY & THERAPEUTICS  **Does this look like an authentic source?**  Yes, it has authentic source. |
| **Date of Publication** | **When was it published?**  It was published in 2020.  **Does the paper focus on current issues?**  Yes, it is focus on the current issues. |
| **Purpose of the study** | **Why was this study carried out?**  This study is carried out to characterize the global diabetes technology landscape, focusing on emerging trends in device uptake, clinical utility and guidance, device access, educational strategies, and perceived benefit and burden of device use.  **What is the knowledge gap this paper is trying to fill?**  This article begins by highlighting new data from the Type 1 Diabetes (T1D) Exchange Registry, which provides relevant insight into diabetes technology trends in the United States from 2016 to 2018.  Extra-technological factors that help or hinder individuals who use diabetes technology to manage their diabetes. |
| **Methods** | **How was this study carried out?**  Data on sensor augmented pumps (SAP) and hybrid closed loops (HCL) insurance coverage and cost-effectiveness are reviewed. New data from educational randomized control trials (RCT) are presented to highlight the importance of education in all aspects of diabetes self-management.  **Were there any specific procedures?**  Out of 42 articles which were found, 10 were reviewed.  **What data was used, who were the participants for the experiments, how was the analysis done etc.?**  There were no direct participants but the data from other article were reviewed in order to write this article. |
| **Finding of the study** | **What was found in the study?**  We are currently living in a diabetes technology "golden age": small, accurate, and simple-to-use CGMs may soon make blood glucose testing obsolete, while pumps are increasingly being integrated with sensors to automate insulin delivery for better glycemic results. |
| **Implications of Findings** | **How will the findings benefit society or bridge the knowledge gap?**  As these technologies become more widely used in routine care for people with T1D and T2D, the widespread use of automated decision support has the potential to offset and reduce overall healthcare costs by improving outcomes with more efficient clinical resource investment. |
| **URL Link** | <https://www.liebertpub.com/doi/epdf/10.1089/dia.2020.2509> |

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| **Title (2)** | **What is the title of the paper?**  The impact of a structured education and treatment  programmed (FLASH) for people with diabetes using  a flash sensor-based glucose monitoring system:  Results of a randomized controlled trial  **Does it have the keywords that you are searching for?**  Yes, it has. |
| **Author** | **Who is the lead author and co-author**?  Norbert Hermanns, Dominic Ehrmann, Melanie Schipfer, Jens Kro¨ger, Thomas Haak and Bernhard Kulzer.  **Which organizations or institutions they belong to?**  Research Institute Diabetes Academy Mergentheim (FIDAM),  Department of Clinical Psychology and Psychotherapy, Diabetes Clinic Mergentheim, Centre of Diabetology Hamburg Bergedorf, Profusa, Inc.  **Are these organizations or institutions reputable? Search for it on their websites.**  Yes. |
| **Publication Type** | **Is this paper published in a journal or a conference proceeding, magazine etc.?**  International Diabetes Federation  **Does this look like an authentic source?**  Yes, it does. |
| **Date of Publication** | **When was it published?**  4 March 2019  **Does the paper focus on current issues?**  Yes, it does. |
| **Purpose of the study** | **Why was this study carried out?**  This case study's goal is to test FLASH, a structured education and treatment program to help FSGM users understand and use available glycemic information for diabetes treatment optimization.  **What is the knowledge gap this paper is trying to fill?**  This paper tried to test randomized controlled trial that structured diabetes education about the use of FSGM can result in a significant improvement in glycemic control in people with diabetes who are on intensive insulin therapy. |
| **Methods** | **How was this study carried out?**  FLASH is a 6-month randomized controlled trial of a structured education program. It was carried out in 26 outpatient centers throughout Germany, each with at least one endocrinologist and one diabetes educator. Participants ranged in age from 16 to 75 years old, were on multiple daily injections or CSII, and had used or planned to use an FGM.  **Were there any specific procedures?**  No, the authors were not required to follow any particular steps in order to publish a review paper.  **What data was used, who were the participants for the experiments, how was the analysis done, etc.?**  It was carried out in 26 patient centers throughout Germany, each with at least one endocrinologist and one diabetes educator. Participants ranged in age from 16 to 75 years old, were on multiple daily injections or CSII, and had used or planned to use an FGM. |
| **Finding of the study** | **What was found in the study?**  Diabetes education in relation to the use of FSGM has the potential to improve the outcomes of this novel glucose monitoring method beyond the improvements seen with FSGM use. |
| **Implications of Findings** | **How will the findings benefit society or bridge the knowledge gap?**  This is the first randomized trial to look at the impact of structured education on FGM use in diabetics. Structured education may help to improve glycemic control and levels of diabetes distress and satisfaction. |
| **URL Link** | <https://www.diabetesresearchclinicalpractice.com/article/S0168-8227(18)31818-7/fulltext> |

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| **Title (3)** | **What is the title of the paper?**  Embracing change: practical and theoretical considerations for successful implementation of technology assisting upper limb training in stroke.  **Does it have the keywords that you are searching for?**  Yes, it has. |
| **Author** | **Who is the lead author and co-author**?  Ananda Hochstenbach-Waelen and Henk AM Seelen.  **Which organizations or institutions they belong to?**  Adelante Centre of Expertise in Rehabilitation and Audiology, Department of Industrial Design, User Centred Engineering Group, Research School CAPHRI, Department of Rehabilitation Medicine  **Are these organizations or institutions reputable? Search for it on their websites.**  Yes. |
| **Publication Type** | **Is this paper published in a journal or a conference proceeding, magazine etc.?**  JOURNAL OF NEUROENGINEERING AND REHABILITATION  **Does this look like an authentic source?**  Yes, it does. |
| **Date of Publication** | **When was it published?**  2 August 2012  **Does the paper focus on current issues?**  Yes, it is. |
| **Purpose of the study** | **Why was this study carried out?**  Currently, implementation of this technology in clinics is limited. The purpose of this study was to identify criteria and conditions that people involved in the development of such technology should consider in order to achieve a (more) successful implementation of the technology in the clinic.  **What is the knowledge gap this paper is trying to fill?**  In order to meet the increasing therapy demand, rehabilitation technology for upper limb training in stroke patients may play an important role as a therapy tool in the future. |
| **Methods** | **How was this study carried out?**  A literature search was conducted in the PubMed and IEEE databases, as well as semi-structured interviews with stroke rehabilitation therapists, to identify the criteria and conditions that technology should meet in order to facilitate (implement) technology-assisted arm-hand skills training in stroke rehabilitation therapy. Furthermore, an implementation strategy commonly used in general health care was used to create a step-by-step guide to help with the successful implementation of this technology in stroke therapy. This guidance incorporates implementation-related criteria mentioned by therapists during interviews.  **Were there any specific procedures?**  No, in order to release a research article, the authors were not required to adhere to any specific procedures.  **What data was used, who were the participants for the experiments, how was the analysis done, etc.?**  Patient who required therapy or training for the upper limb were the participants through which date were gathered and analysis for the output. |
| **Finding of the study** | **What was found in the study?**  The reported requirements are important as a guide for those involved in the development of rehabilitation technology for stroke patients' arm-hand therapy. The step-by-step guide serves as a tool for facilitating successful technology implementation in clinical practice, thereby meeting future therapy demand. |
| **Implications of Findings** | **How will the findings benefit society or bridge the knowledge gap?**  Technology development in response to therapist needs and desires is critical for future use of technology in therapy. Feedback from end users during the development phases may help to improve a device. The reported guide, which includes implementation-related criteria and conditions from a therapist's perspective, may be helpful in facilitating the successful implementation of useful and usable technology in clinical practice. |
| **URL Link** | <https://jneuroengrehab.biomedcentral.com/articles/10.1186/1743-0003-9-52> |

B. After preparing the tables, students are required to prepare background research by answering following questions? (400 words or more expected). Please refer to the sample writeup presented during the lecture and include the following key points in your writeup.

* Identify different point of views in the past studies
* Elaborate on research findings that align with your point of view
* Identify the limitations and the impact of the limitations
* Describe the purpose statement of your study
* List research questions needed to understand the purpose statement in depth/detail.
* List research objectives that you can evaluate with your research findings.

You are strictly required to follow ACM styling and referencing formats when using the three scholarly publications that you have used in answering A.

Please save this file using the following naming standard. {your name} {course name} {assignment number}, for e.g. John\_Project\_Foundation\_Assignment\_2

**Background Research**

As the project type I have chosen is “Practical implementation of a system or technology”. I have researched different journals, article, papers, etc. for this topic. I have come up with 3 different articles which I think meet the requirement of practical implementation of a system or technology. As the system or technology is developing in an immense rate new innovation are made in order to make our life easy and healthy. There is no field untouched by technology education, transportation, agriculture, health, etc. With the advancement of the technology AI are developed and implemented in a different sector, which help us to save our time and money. I have mainly focused technology that are implemented in health sector and how they are preforming to make patient life easier.

In those research, I study how different technology or system are being introduced in different field of health which is helping the patient and the organization to keep and maintain the health of the organization. Although in the past the technology or system is used rarely used in the health as well as other field, now it is vastly used. From monitoring the diabetes, insulin, etc., finding the disease in the patient and helping the patient who are recovering from the disease. Technology also help us to prevent from the disease.

As the technology is involved in every field, qualified professional are required in order to operate the technology. While implementing the technology there are many guidelines we have to follow to get the desired result. Technology can operate automatically with certain algorithm and program but the professional need to maintain it and have the knowledge of those this operate so that they can work smoothly and help the people easily.

This research aim is global technology landscape, focusing on emerging trends in device uptake, clinical utility and guidance, device access, educational strategies, and perceived benefit and burden of device use. Diabetes technology is currently in a "golden age": small, accurate, and simple-to-use CGMs may soon make blood glucose testing obsolete, while pumps are increasingly being integrated with sensors to automate insulin delivery for better glycemic result[3]. Nonetheless, the data clearly show that devices alone will not improve diabetes outcomes: for these technologies to impact outcomes, people truly, positively with diabetes must have access to the devices and supplies they need, as well as the educational support they need to effectively integrate them into their own self-management practices. Randomized controlled trial demonstrated that structured diabetes education about the use of FLASH can result in a significant improvement in glycemic control in people with diabetes who are on intensive insulin therapy. The addition of diabetes education to FLASH use has the potential to improve the outcomes of this innovative glucose monitoring method beyond the improvements seen with FSGM use alone[1]. The reported requirements are important as a guide for those involved in the development of rehabilitation technology for stroke patients' arm-hand therapy. The step-by-step guide serves as a tool for facilitating successful technology implementation in clinical practice, thereby meeting future therapy demand[2].

No matter how much the technology is used in the health sector, it order to get the desired outcome it is needed to reach to the people who needed it the most. Guidelines should be used and follow while using the technology in this field. So that the technology is developed and improved further which can help all greatly.

REFERENCE: -

[1] Norbert Hermanns, Dominic Ehrmann, Melanie Schipfer, Jens Kröger, Thomas Haak, and Bernhard Kulzer. 2019. The impact of a structured education and treatment programme (FLASH) for people with diabetes using a flash sensor-based glucose monitoring system: Results of a randomized controlled trial. *Diabetes Research and Clinical Practice* 150, (April 2019), 111–121. DOI:https://doi.org/10.1016/j.diabres.2019.03.003

[2] Ananda Hochstenbach-Waelen and Henk AM Seelen. 2012. Embracing change: practical and theoretical considerations for successful implementation of technology assisting upper limb training in stroke. *Journal of NeuroEngineering and Rehabilitation* 9, 1 (August 2012), 52. DOI:https://doi.org/10.1186/1743-0003-9-52

[3] Practical Implementation of Diabetes Technology: Real‐World Use. DOI:https://doi.org/10.1089/dia.2020.2509