1) Purpose and Instructional Need (include goals and objectives)

This proposal seeks to promote technology integration in our teacher candidates' emergent literacy teaching. Specifically, this requests early childhood robotics devices (e.g., Six LEGO WeDo 2.0 sets, six Bee-Bots), 12 iPads for developmentally-appropriate coding and eBook writing, and accessories/carriers for these devices. These resources will be used for LITED3119 Language Development and Emergent Literacy and its practicum component.

LITED3119 Language Development and Emergent Literacy course deals with language and literacy development during early childhood (PreK-2nd grade). Research has found that many early childhood teachers are not familiar to STEM (Science, Technology, Engineer, and Mathematics) disciplinary language and discourse, which prevents their young students from being exposed to STEM fields. Because of this, robotics and programming language, an important STEM subject, are rarely introduced in early childhood classrooms, especially in K-2 (Bers, 2007). Teacher candidates’ hands-on learning with robotics and coding can be an effective preparation for their future STEM teaching. In addition, the language-based approach to robotics and coding in LITED3119 emphasizes integrated methods of teaching, which allows them to teach literacy and STEM at the same time.

Recently, both traditional language (oral and written) and computer programming language have been studied in linguistics. Specifically, computational linguistics, which integrates knowledge bodies of traditional linguistics and computer science, have fed cutting-edge industries such as Google, Facebook, Apple, and Oracle. In this vein, the concept of coding literacy education (Vee, 2017) is emerging in education. It is timely for teacher education to incorporate robotics and programming language in the curriculum. Therefore, this proposal addresses the following goals and objectives for the use of robotics devices and iPads in the LITED3119 Language Development and Emergent Literacy course:

**GOAL 1.** Teacher candidates will describe pedagogical content knowledge about early childhood robotics using robotics devices, verbal language, and coding language.
- Objective 1. Teacher candidates will define developmentally appropriate robotics for PreK-2 children using robotics devices, verbal language, and coding language.
- Objective 2. Teacher candidates will identify vocabulary words used in developmentally appropriate robotics for PreK-2 children’s literacy development.

**GOAL 2.** Teacher candidates will integrate robotics and coding language in their emergent literacy teaching.
- Objective 1. Teacher candidates will design lesson plans to teach PreK-2 children to use robotics devices and coding language to create fiction and nonfiction digital stories.
- Objective 2. Teacher candidates will teach PreK-2 children how to use robotics devices and coding language to create fiction and nonfiction digital stories.

2) Identify how project will impact and benefit student learning include % affected and number affected.

LITED3119 is a required course for teacher candidates who pursue Literacy Education as a minor. Each academic year we have **100-120 teacher candidates** who take this course in average. And there will be a potentially larger number than that in the future, considering the growing number of teacher candidates who are interested in obtaining a reading endorsement, caused by the current nationwide literacy emphasis in schools. These teacher candidates work with PreK-2 students one-on-one in Cedar Valley schools for practicum. The classroom teachers of these PreK-2 students, usually 4-5 teachers a year, observe our pre-service teachers’ practicum. There will be a modeling effect for in-service teachers'
innovative practices. The teachers can see how robotics can be integrated in early literacy teaching through their observation of our teacher candidates’ lessons. They can consider early childhood robotics for their teaching. Therefore, the robotics and coding tools can impact approximately 245 people in total, each academic year.

3) Describe how project aligns Educator Preparation Conceptual Framework and/or your department/division program goals.

   This project aligns with Goals 1 and 2 of COE Educator Preparation Conceptual Framework.
   
   GOAL 1. Candidates must deeply understand and reflect on their content and pedagogy: Teacher candidates will deeply understand and reflect on pedagogical content knowledge of emergent literacy to integrate robotics in teaching young children. They will create developmentally appropriate robotics lessons for student-centered instruction.
   
   GOAL 2. Candidates must engage in rich, purposeful, and authentic field-based experiences to develop appropriate dispositions and practices: Teacher candidates will use robotics resources in PreK-2 classrooms in Cedar Valley. This will particularly be a purposeful and authentic experience for robotics.

   This project also aligns with InTASC standards #1 Learner Development, #2 Learning Differences, #3 Learning Environments, #4 Content Knowledge, #5 Application of Content, #6 Assessment, #7 Planning for Instruction, #8 Instructional Strategies, #9 Professional Learning and Ethical Practice, and #10 Leadership and Collaboration. The teacher candidates will demonstrate their proficiency in robotics content knowledge and pedagogical knowledge for creating developmentally appropriate learning environments using instructional strategies for PreK-2 children’s robotics exploration. While they collaboratively create their lesson plans and teach in practicum, they will also demonstrate proficiency in professional learning and leadership.

   Finally, this project aligns with ILA (International Literacy Associations) Standards for PreK and Elementary Classroom Teacher which are relevant to our Literacy Education division program. Standard 1 Foundational Knowledge, Standard 2 Curriculum and Instruction, Standard 5 Literate Environment, and Standard 6 Professional Learning and Leadership are addressed. These standards do address changing terrains of literacy due to ever-developing technology tools (e.g., new literacies, multimodal literacy). Robotics have instructors modify and optimize literacy learning environments for young children in the changing world. This causes many learning needs of teachers in their professional development. Our teacher candidates will be well-prepared for these standards.

4) Describe your plan to assess the impact of the technology project on student learning.

   Pre- and post- assessments to determine the impact of the technology project on teacher candidates are twofold: 1. Naturalistic vocabulary growth in robotics; 2. Teacher candidates’ TPACK (Technological Pedagogical Content Knowledge) growth. Naturalistic vocabulary growth in robotics will be captured in candidates’ conversation transcripts. Computerized Language Analysis (CLAN) will be used to analyze the candidates’ lexical diversity in robotics. And Survey of Preservice Teachers’ Knowledge of Teaching and Technology (Schmidt et al, 2009) will be used to determine teacher candidates’ TPACK growth.

5) Support Needed:

   a. Who will install technology and provide technical support for project? Neil Clopton for setting up iPad applications (e.g., Lego WeDo 2.0; Scratch Jr.; Bee-Bot; VoiceThreads; Little Bird Tales; Google apps: Doc, presentation, sheets)

   b. Where will resources be installed? Building_SEC_Room #107. All of these resources are mobile. They will be used in UNI SEC classrooms for LITED3119 and in Cedar Valley schools for LITED3119 practicum. When they are not used by teacher candidates, they will be located in SEC107A.

   c. Does this room have the necessary data & electrical infrastructure required for your resources? YES

   d. Does this proposal include funds to add the necessary infrastructure if not present? NO.

Note: All funded proposals will be required to submit a report summary and will be invited to present an overview of project during Spring 2018 semester.
### Project: Early Childhood Robotics and Coding

Attach hard copies of price quotes. Indicate which attached page goes with each item below.

<table>
<thead>
<tr>
<th>Product #</th>
<th>Vendor</th>
<th>Product Description</th>
<th>Quantity</th>
<th>Item Price</th>
<th>Total</th>
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<tbody>
<tr>
<td>1 (p. 4)</td>
<td>Apple (through Neil Clopton)</td>
<td>iPad Wi-Fi with 128 GB storage</td>
<td>12</td>
<td>399</td>
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<td>2 (p. 5)</td>
<td>education.lego.com</td>
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<td>Hive for 6 Bee-Bots</td>
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<td>599.95</td>
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<td>4 (p. 7)</td>
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<td>TacTile Reader for Bee-Bots</td>
<td>6</td>
<td>129.95</td>
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<td>TacTile Reader Standard Tile Pack</td>
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<td>iPad 16 Pack Transport Case</td>
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Total 8260.24
Product #1.

Neil Clopton’s quote is $399.00 for the same product.
Product #2.

LEGO® Education WeDo 2.0 Core Set

3 of 5

$175.95

For 2 students

ADD TO BASKET
Product #3.

Hive

The Hive is a set of 6 Bee-Bots or Blue-Bots with the Bee-Bot Backpack to store them in and the Docking Station to recharge them. The Bot Hive is an economical way to bring the excitement and learning of Bee-Bot or Blue-Bot to an entire class. Locate a Hive in your classroom and see the students start buzzing!

Related

Docking Station

$69.95
Add to Wishlist

Bee-Bot

$89.95
Add to Wishlist

Backpack

$39.95
Add to Wishlist

$649.60
Availability: In stock
Special Price

$599.95

Add to Wishlist
Add to Compare
Share

Please select your bots: *

- Bee-Bot

https://www.bee-bot.us/bee-bot-bundles/bot-hive.html

* Required Fields
Product #4.

TacTile Reader

The Blue-Bot TacTile Reader is a unique, hands-on programming device to control Blue-Bot with tiles representing each Blue-Bot command.

Related

Blue-Bot

$119.95
Add to Wishlist

Blue Connection

$249.90
Special Price $1
Add to Wishlist

$129.95
Availability: In stock

Add to Wishlist
Add to Compare
Share

Special price if purchased with the TacTile Reader!

- Extra Standard Tile Pack + $39.95
- Extension Tile Pack + $39.95

Add to Cart
Qty: 1

Check out with PayPal

Product #5.

TacTile Reader Standard Tile Pack

The TacTile Reader Standard Tile Pack provides 25 additional standard movement tiles to use to program Blue-Bot with the TacTile Reader.

Related

TacTile Reader

$129.95

Add to Wishlist

TacTile Reader Extension Tile Pack

$49.95

Add to Wishlist

$49.95

Availability: In stock
Product #6.

TacTile Reader Extension Tile Pack

The TacTile Reader Extension Tile Pack contains 25 tiles offering extended commands for Blue-Bot, including 45 degree angles and repeat sequences.

Related

TacTile Reader

$129.95

Add to Wishlist

TacTile Reader Standard Tile Pack

$49.95

Add to Wishlist

$49.95

Availability: In stock
Product #7.

iPad Transport Case 16 Pack

iPad 16 Pack transports 16 standard configured iPads and 16 chargers & cables. To order a case for iPads with protective covers please specify dimensions when ordering your case.

iPad 16 Pack Transport Case

PART NUMBER (for iPad or 9.7-inch iPad Pro):
IPD-322112-16PACK
PRICE $437.49