

**U.S. Department of Education - EDCAPS
G5-Technical Review Form (New)**

Status: Submitted

Last Updated: 06/14/2019 01:12 PM

Technical Review Coversheet

Applicant: Louisiana Department of Education (U411C190127)

Reader #1: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	25	25
Quality of Project Design		
1. Project Design	35	31
Adequacy of Resources/Quality of Management Plan		
1. Resources/Management Plan	20	17
Sub Total	80	73
Priority Questions		
Competitive Preference Priority		
Competitive Preference Priority		
1. Absolute Priority 3	5	5
Sub Total	5	5
Total	85	78

Technical Review Form

Panel #16 - EIR Early Phase Tier 1 - 16: 84.411C

Reader #1: *****

Applicant: Louisiana Department of Education (U411C190127)

Questions

Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:

(1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

(2) The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

Strengths:

The potential contribution of the proposed project to increase knowledge of an educational problem is positive and contemporary as a vehicle to increase pre-engineering training to secondary students who are identified as high need. This project proposes to make training available that will develop and implement a scalable set of micro-credentials that students in grades 9 through 12 will have available for pre-engineering and computer science-related careers or college majors. This applicant proposes that the project will increase knowledge in a field that craves competent secondary teachers qualified to teach such courses. The applicant's partner (Rand Corporation) has the special expertise in this particular field and will oversee a rigorous evaluation of this micro-credential development ensuring that they are rigorous and meet engineering standards. In the end, both teachers' knowledge and expertise will be enhanced, and students will have opportunities to prepare early on for college and or employment after completing their high school diploma. The applicant proposes that the project will increase knowledge of the practice as it is disseminated to teachers and then to students, thus preparing them for the fields of computer science and engineering. This project will impact over 6,000 students in the state of LA. The applicant proposes that this initiative satisfies a growing demand for engineering and computer science training in fields that are hard pressed to find qualified candidates. (Abstract)

The proposed project builds on and involves the development of promising new strategies that add to existing strategies. In this project the opportunity for teachers to provide computer science instruction via the use of micro-credentials will allow teachers to teach computer science courses upon submitting a portfolio of evidence from their daily classroom practice, thus demonstrating that they have developed the requisite competencies. This approach is an example of a new promising strategy. The extension of this micro-credential program from this practice was first used for ELA and Math Content Leaders in LA. This new project builds on their program, allowing effective teachers to stay in the classroom and in some cases account for 40% of the experiential requirements for a Leadership Certificate. This is a strength because it allows this program to extend to STEM Pathways which is a priority for this funding. The concept behind micro-credentials is that it is a form of professional development, involving teachers developing portfolios of evidence regarding their everyday class instruction and then allowing them to demonstrate mastery in multiple ways. The project component has expanded this year to 30 schools, serving 1600 students, including; 72% high need students. The perceived strength of this project concept is the ability to bring change to the face of pullout professional development programs that leave students without their regular classroom teachers for several days during the school year with a substitute teacher. This is especially true in districts with high-need students.

Weaknesses:

None noted.

Reader's Score: 25

Selection Criteria - Quality of Project Design

1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

(1) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

(2) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.

(3) The adequacy of procedures for ensuring feedback and continuous improvement in the operation of the proposed project.

Strengths:

1. The goals, objectives and outcomes for this project as presented are, for the most part clearly specified and measurable. The four goals follow a logical sequence in terms of the end product and project desired outcomes. For example, the first goal: "Develop, pilot and refine micro-credentials for teachers in Pre-Engineering and DDEM Pathways that provide a scalable, competency-based certification system." This goal logically leads to using LSU (IHE) to work in partnership with BBI with LDOE oversight to plan and develop micro-credentials that address key gaps in teachers' current training and focus on major competencies that teachers need to teach in the Preengineering and DDEN Pathway. Goal 2 follows with the need to implement the micro-credentials successfully. Their table 1-Project Goals, Objectives and Outcomes for Years 1-4 (Y1-Y4) consolidates the four project goals, objectives and outcomes in one place. This applicant presents their Table 2-Micro-credential Course Sequence in succinct specific terms which lays out what topic titles are needed to be learned for the credential. The reviewer perceives the stated recruitment outcome of over 600 teachers who have voluntarily completed those programs in a variety of academic subjects to date as a strength. E41

2. The applicant's conceptual framework underlying the proposed project, builds on existing resources to support the development and implementation of micro-credentials to prepare teachers of engineering and computer science courses in Jump Start Pathways. Most importantly, their framework has the potential to improve students' motivation to pursue STEM college or career courses and to improve student learning and achievement in geographic areas that do not traditionally provide the opportunity to do so. The applicant proposes that this can eventually lead to better student postsecondary outcomes and careers in STEM. This is a strength since it addresses the stated need to provide resources that allow students in rural and high-need areas in LA, opportunities for access into a field (STEM and Engineering) that is experiencing a lack of qualified candidates. It provides a new way of providing staff development that allows the teacher and student to remain in the classroom while gaining the credentials and knowledge needed. The applicant's work builds on the existing experience and expertise of BBI and LSU to design a strong set of micro-credentials reflecting both best practices for micro-credential programs and strong content and pedagogical expertise in engineering and computer science. It is a win-win approach with an underlying framework that is innovative and exciting in a field that remains traditional in its approach to change in an ever-changing society. E44

3. The applicant provides aspects of procedures for ensuring feedback and continuous improvement in the operation of the proposed project. They include their three main mechanisms: (1) annual webinars highlighting current project work and findings; (2) BBI's customized training sessions to coach teachers on the process of engaging in competency-based professional development, preparing and submitting portfolios required to earn a micro-credential and navigate their platform including obtaining survey data to gauge teachers' perceptions of the program; and (3) the partners will collaborate with RAND to engage in design-based implementation research using the data RAND and BBI collect along with feedback from all stakeholders. These three main mechanisms coupled with monthly calls among the project

partners are designed to solicit information about program implementation and provide updates on evaluation progress and findings to date. E45

Weaknesses:

1. The applicant does not specifically detail how these outcomes will be measured. Under Goal 3 for example – 90% of teachers meet fidelity of implementation measures set for micro-credentials. The applicant does not indicate if that is by testing, course completion? The applicant does not specify the measuring tool for that outcome to determine if their outcome was met.

3. The applicant, in discussing project feedback, does not provide any discussion that is school based to reflect how project activities and components are influencing what takes place in participant schools and how direct feedback from school and school district administrators is provided to the lead agency and its partners; including any interest from students and parents who may be excited about future opportunities. Input from industry partners, such as collecting feedback from industry and business representatives would strengthen the application.

Reader's Score: 31

Selection Criteria - Adequacy of Resources/Quality of Management Plan

1. The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:

(1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

(2) The qualifications, including relevant training and experience, of key project personnel.

(3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.

Strengths:

1. The management plan as presented is adequate to achieve the objectives of the proposed project on time and within budget including the inclusion of clearly defined responsibilities, timelines to accomplishing project tasks. Table 3-Project Timeline as presented by the applicant displays the four goals, the activity to be accomplished, the timeline and which partner has direct responsibility for the activity. This reviewer recognized in the management plan that the timeline allows a year to ensure adequate time for the development and testing of the micro-credentials to ensure that the final product works well and does what it is intended to do. The timeline also allows RAND the opportunity to gather data on teaching and learning for a full year after teachers have completed the micro-credential in order to understand longer-term impacts of the micro-credentials. E45

2. The qualifications, training and experience of key project personnel are strong and well detailed. Complete resumes in support of key personnel illustrating extensive experience and accomplishment in their respective area of expertise is provided by the applicant. The applicant has gathered a cross section of key personnel from the project partners. State team members include the State Assistant Superintendent of Academic Content and the State Director of Math, Science and STEM, who will be the leads in this project. Faculty from LSU are identified and include a Professor of Mathematics who is also the Executive Director of the Cain Center. Additional names and responsibilities of key personnel from BBI are also listed with their roles and responsibilities in carrying out the project. E47

3. The potential for continued support of the project after federal funding ends is exemplified by the plan for the LDOE, as the lead agency to support the efforts of micro-credentialing on a state level and help ensure that the process is approved by the state board of education. Micro-credentialing includes a requirement for an ancillary program certification for teachers who teach in the pre-engineering and DDEM pathways. This will support teacher career ladders which will count for a percentage of the experiential requirement for an educational leadership certificate. LDOE will draw upon funding through Career Development Funds which support students' access to high-value course and training. The applicant has planned for the continued support of their project after funding ends. E48

Weaknesses:

1. The applicant does not provide an opportunity for teacher participants who are involved in the credentialing in the first year to meet to get a (group) sense of how the program is progressing. The applicant's project would be strengthened with additional details associated with their teacher recruitment efforts, specifically for both the project and pilot phase of the project.

The applicant does not list milestones as part of this criteria section in their narrative support of this section.

Reader's Score: 17

Priority Questions

Competitive Preference Priority - Competitive Preference Priority

1. Within Absolute Priority 3, we give competitive preference to applications that address the following priority:

Projects designed to improve student achievement or other educational outcomes in computer science (as defined in the notice). These projects must address the following priority area:

Expanding access to and participation in rigorous computer science (as defined in the notice) coursework for traditionally underrepresented students such as racial or ethnic minorities, women, students in communities served by rural local educational agencies (as defined in the notice), children or students with disabilities (as defined in the notice), or low-income individuals (as defined under section 312(g) of the Higher Education Act of 1965, as amended).

Note: Projects addressing this priority must be administered in a manner consistent with nondiscrimination requirements contained in the U.S. Constitution and Federal civil rights laws.

Strengths:

The applicant strongly addresses this competitive priority by expanding access to and participation in rigorous computer science coursework for traditionally underrepresented students. The applicant's project is specifically geared to provide advanced computer science principles and theories, computational thinking, computer hardware and software design within the context of micro-credentials teachers on a state level who will impart their training and knowledge to secondary school students. Once credentialed with the following courses and expertise, students will benefit from increased knowledge in STEM and computer learning embedded in this competitive preference. This grant application specifically targets the professional preparation and credentialing of teachers in STEM coursework with deliberate opportunity to learn about, engage in, and practice high quality STEM teaching content and pedagogy. The course names are clearly detailed on Table 2-Micro-credential Course Sequences which are clearly representative of the criteria for this priority. E40

Weaknesses:

None noted.

Reader's Score: 5

Status: Submitted

Last Updated: 06/14/2019 01:12 PM

Status: Submitted

Last Updated: 06/14/2019 07:46 PM

Technical Review Coversheet

Applicant: Louisiana Department of Education (U411C190127)

Reader #2: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	25	25
Quality of Project Design		
1. Project Design	35	32
Adequacy of Resources/Quality of Management Plan		
1. Resources/Management Plan	20	20
Sub Total	80	77
Priority Questions		
Competitive Preference Priority		
Competitive Preference Priority		
1. Absolute Priority 3	5	5
Sub Total	5	5
Total	85	82

Technical Review Form

Panel #16 - EIR Early Phase Tier 1 - 16: 84.411C

Reader #2: *****

Applicant: Louisiana Department of Education (U411C190127)

Questions

Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:

(1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

(2) The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

Strengths:

The proposed DDEM pathway project provides explicit research findings regarding the need for STEM and computer science related instruction in the State of Louisiana as stated on page 1 or e32. According to the research, there is a significant shortage of qualified Engineering and Computer Science related job applicants. Therefore, the applicant proposes to develop, implement, and test the feasibility of teacher micro credentialing to determine its impact on STEM teaching and learning in an effort to produce more job ready applicants.

DDEM proposes to provide alternative strategies that build upon the current Jump Start Pathway. For example, on page 4 or e35 based upon the micro credentialing inquiry approach, portfolio development, and evaluation techniques included in the project, if implemented as stated, these strategies are designed to increase the number of competency-based certifications for teachers, thus improving outcomes for students.

Weaknesses:

There are no weaknesses noted in this section.

Reader's Score: 25

Selection Criteria - Quality of Project Design

1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

(1) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

(2) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.

(3) The adequacy of procedures for ensuring feedback and continuous improvement in the operation of the proposed project.

Strengths:

The applicant clearly identifies goals, objectives, and outcomes as stated on page 8 or e39 that are specific and measurable. For example, the goal to improve, spread and sustain micro-credentialing model in Louisiana is significant because it expands or increases the number of credentialed teachers statewide, thus impacting a large percentage of high needs students.

The applicant provides some research findings to support its conceptual framework as stated on page 12 or e43 as well as a Logic Model in Appendix G or e114 that clearly explains the proposed micro credentialing process.

As stated on page 13 or e44, DDEM Pathway project will ensure feedback and continuous improvement throughout the grant project. Participants will participate in annual webinars, portfolio submissions, ongoing discussions and monthly telephone calls. These modes of continuous communication will allow grant staff opportunities to make adjustments that will help to ensure that the project is successful.

Weaknesses:

The applicant's research findings related to its conceptual framework are limited as stated on page 12 or e43.

Reader's Score: 32

Selection Criteria - Adequacy of Resources/Quality of Management Plan

1. The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:

(1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.

(2) The qualifications, including relevant training and experience, of key project personnel.

(3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.

Strengths:

In table 3 on page 15 or e46, DDEM pathway project provides a detailed management plan that includes activities, timelines and responsible staff to demonstrate how it plans to achieve the proposed goals.

The applicant identifies the training and experience of key project personnel in Appendix B or e63.

The possibility that local schools may provide future monetary costs as well as the Louisiana Department of Education through federal and state funding streams provides evidence of potential funding beyond the end of the grant period as stated on page 17 or e48.

Weaknesses:

There are no weaknesses noted in this section.

Reader's Score: 20

Priority Questions

Competitive Preference Priority - Competitive Preference Priority

1. Within Absolute Priority 3, we give competitive preference to applications that address the following priority:

Projects designed to improve student achievement or other educational outcomes in computer science (as defined in the notice). These projects must address the following priority area:

Expanding access to and participation in rigorous computer science (as defined in the notice) coursework for traditionally underrepresented students such as racial or ethnic minorities, women, students in communities served by rural local educational agencies (as defined in the notice), children or students with disabilities (as defined in the notice), or low-income individuals (as defined under section 312(g) of the Higher Education Act of 1965, as amended).

Note: Projects addressing this priority must be administered in a manner consistent with nondiscrimination requirements contained in the U.S. Constitution and Federal civil rights laws.

Strengths:

The applicant proposes to provide at least nine rigorous courses in computer science instruction such as Understanding Computational Thinking, Teaching Software Development, Teaching Basic Programming Skills, and Data Manipulation & Analysis as identified on page 9 or e40 to increase teacher knowledge as part of its micro-credentialing program. This coursework will allow teachers to target underrepresented students in high needs schools as proposed.

Weaknesses:

There are no weaknesses noted in this section.

Reader's Score: 5

Status: Submitted
Last Updated: 06/14/2019 07:46 PM

Status: Submitted

Last Updated: 06/14/2019 04:14 PM

Technical Review Coversheet

Applicant: Louisiana Department of Education (U411C190127)

Reader #3: *****

	Points Possible	Points Scored
Questions		
Selection Criteria		
Significance		
1. Significance	25	25
Quality of Project Design		
1. Project Design	35	32
Adequacy of Resources/Quality of Management Plan		
1. Resources/Management Plan	20	20
Sub Total	80	77
Priority Questions		
Competitive Preference Priority		
Competitive Preference Priority		
1. Absolute Priority 3	5	4
Sub Total	5	4
Total	85	81

Technical Review Form

Panel #16 - EIR Early Phase Tier 1 - 16: 84.411C

Reader #3: *****

Applicant: Louisiana Department of Education (U411C190127)

Questions

Selection Criteria - Significance

1. The Secretary considers the significance of the proposed project. In determining the significance of the proposed project, the Secretary considers the following factors:

(1) The potential contribution of the proposed project to increased knowledge or understanding of educational problems, issues, or effective strategies.

(2) The extent to which the proposed project involves the development or demonstration of promising new strategies that build on, or are alternatives to, existing strategies.

Strengths:

1. The proposal highlights the significance of the project that will support the certification of teachers in STEM and related fields. Louisiana Department of Education (LDOE) working with Louisiana State University (LSU) have developed Louisiana's Pre-Engineering and Digital Design & Emergent Media (DDEM) Pathways courses to provide students' 21st century skills, developing their computational thinking ability, and applying math and science to solve complex problems (e33). The development of these courses is a response to the need for individuals with industry-based credentials and have the background or skills to enter a middle-skills job or a college major in an engineering or digital design field after graduation. The narrative identified the lack of flexible teacher certifications for individuals who want to be able to teach in STEM or related areas. Data was presented on the number of teachers who received certification in various STEM-related subjects. Nationally, 51 individuals received a computer science certification in 2015 (e34) The approach described in the narrative presents a process that provides six weeks of training for various content areas such as Introduction to Engineering and Introduction to Computational Thinking (e35).

2. The applicant provides a strong rationale for the development and implementation of micro-credentials for teaching computer science courses. Micro-credentialing is an assessment of a specific competency which Louisiana ELA and Math Content Leaders and other areas implemented for ancillary certification (e35). The solid and comprehensive approach for micro-credentialing will be designed by BloomBoard, Inc. (BBI) and supported by teacher learning research, including job-embedded cycles of inquiry, teacher portfolios, and rigorous feedback and evaluation. The applicant provides and describes promising new and alternative strategies with a solid rationale for selecting the micro-credentials approach that will be used to reduce the credentialing gaps of teachers who can teach advanced science and computer subjects. The use of micro-credentials would support a scalable, competency-based certification system for Pre-Engineering and Digital Design & Emergent Media (DDEM) Pathways for teachers.

Weaknesses:

No weaknesses noted.

Reader's Score: 25

Selection Criteria - Quality of Project Design

1. The Secretary considers the quality of the design of the proposed project. In determining the quality of the design of the proposed project, the Secretary considers the following factors:

(1) The extent to which the goals, objectives, and outcomes to be achieved by the proposed project are clearly specified and measurable.

(2) The extent to which there is a conceptual framework underlying the proposed research or demonstration activities and the quality of that framework.

(3) The adequacy of procedures for ensuring feedback and continuous improvement in the operation of the proposed project.

Strengths:

1. The narrative includes four solid goals, objectives for each and detailed outcomes/measures. As an example, Goal 2 states that the project will implement the micro-credentials successfully with a randomly selected cohort of teachers who progress through the credentials and receive certifications. The measures indicate that 90% of teachers progress through the micro-credentials as intended (as noted in Fidelity measures) and 85% of teachers complete all the micro-credentials. Each goal is explained, and the measures are also included in the other goals and objectives (e39). In order to receive a micro-credential, the teachers must submit evidence and earn a "demonstrated" score from a certified assessor (e42).

2. The applicant described a comprehensive and precise logic model that includes resources, activities, outputs, short-term outcomes and long-term outcomes (e114). The model is directly related to micro credentials for the preparation of teachers in engineering and computer science courses in Pathways. The logic model focuses on teaching and instruction to engage and motivate students to pursue careers in STEM (e44)

3. The applicant provided three solid approaches to ensure appropriate and constructive feedback for the project. The three approaches are annual webinars, customized training sessions to coach teachers on the process of competency-based professional development, best practices for preparing and submitting the portfolios, and engage in design-based implementation research (DBIR) (e43-44) Each key component is described in the detail and includes annual webinars, updates, challenges, program implementation, and about how the project is leading to improvements in teaching and learning (e45).

Weaknesses:

1. The applicant failed to describe the key elements of the assessment that will be used for the micro-credentialing course. The application did not describe the criteria that will be used to assess the products developed by the teachers to complete the micro-credentialing process except to indicate that a trained assessor will review the teacher submitted materials

2. No weaknesses noted.

3. No weaknesses noted.

Reader's Score: 32

Selection Criteria - Adequacy of Resources/Quality of Management Plan

1. The Secretary considers the adequacy of resources and the quality of the management plan for the proposed project. In determining the adequacy of resources and quality of the management plan for the proposed project, the Secretary considers the following factors:

- (1) The adequacy of the management plan to achieve the objectives of the proposed project on time and within budget, including clearly defined responsibilities, timelines, and milestones for accomplishing project tasks.**
- (2) The qualifications, including relevant training and experience, of key project personnel.**
- (3) The potential for continued support of the project after Federal funding ends, including, as appropriate, the demonstrated commitment of appropriate entities to such support.**

Strengths:

1. The proposal includes an adequate timeline with activities, the time to complete the activity and the responsible staff. The narrative discussed the development and testing of the micro-credentialing process and will provide feedback on the comparison of the control group (e45-46). The budget appears to be aligned to the outcomes of the project.
2. The applicant proposes to use a highly qualified team to manage various aspects of the project. As proposed, the team is comprised of project personnel that possess the skills to accomplish all the tasks. The experiences of the team are described in their resumes (e63) A chart is included that describes the staff member, relevant experience, percentage of time dedicated to the project and key areas of responsibility (e122-127).
3. The evidence presented in the proposed project plan is reasonable for financial sustainability beyond the grant period. To demonstrate the commitment to this project, the applicant presents a plan to use other funds to maintain the program. Through the Board of Elementary and Secondary Education (BESE) approval process, the micro-credentials will become an ancillary certificate program required for teachers who teach in the Pre-Engineering and DDEM Pathways (e48). Additional funding will be available through the Career Development Funds (CDF), which can support students' access to high-value courses and training.

Weaknesses:

No weaknesses noted.

Reader's Score: 20

Priority Questions

Competitive Preference Priority - Competitive Preference Priority

1. **Within Absolute Priority 3, we give competitive preference to applications that address the following priority:**

Projects designed to improve student achievement or other educational outcomes in computer science (as defined in the notice). These projects must address the following priority area:

Expanding access to and participation in rigorous computer science (as defined in the notice) coursework for traditionally underrepresented students such as racial or ethnic minorities, women, students in communities served by rural local educational agencies (as defined in the notice), children or students with disabilities (as defined in the notice), or low-income individuals (as defined under section 312(g) of the Higher Education Act of 1965, as amended).

Note: Projects addressing this priority must be administered in a manner consistent with nondiscrimination requirements contained in the U.S. Constitution and Federal civil rights laws.

Strengths:

The narrative describes the development and implementation of a scalable set of micro-credentials that will provide a competency-based certification system for teachers of courses that will prepare students in grades 9 through 12 for pre-engineering and computer science-related careers or college majors. 100+ teachers in 55 high schools in Louisiana will have the opportunity to complete a set of micro-credentials for the STEM Pathways, impacting over 6,000 students who will receive more rigorous, high-quality instruction in pre-engineering and computer science. Seventy-two percent of the students will be high needs.

Weaknesses:

The applicant did not discuss the computer programming or coding as a tool to create software, manage or manipulate data; or development and management of computer hardware and the other electronics related to sharing, securing, and using digital information.

Reader's Score: **4**

Status: Submitted
Last Updated: 06/14/2019 04:14 PM