

Republic of the Philippines
HOUSE OF REPRESENTATIVES
Quezon City, Metro Manila

Fifteenth Congress
First Regular Session

HOUSE BILL NO. 3999

Introduced by HON. RENE LOPEZ RELAMPAGOS
1st District, Bohol

EXPLANATORY NOTE

This bill, entitled "**An Act to Strengthen Public Elementary and Secondary Schools Computer Science Education and for Other Purposes**" seeks to require the Department of Education (DepEd) to strengthen public elementary and secondary schools computer science education.

Under Section 17 of Article II (Declaration of Principles and State Policies) of the 1987 Philippine Constitution, the state shall give priority, among others, to **education, science and technology**. Also, under Section 1 of Article XIV of the Philippine Constitution, "the State shall protect and promote the right of all citizens to **quality education** at all levels and shall take appropriate steps to make such education accessible to all."

A research on public elementary and secondary schools shows, among others, that **in contrast with public schools, computer education is more generally available at Filipino private schools**. Elementary, secondary and post-secondary institutions, plus numerous commercial schools, offer courses of varying quality. One of the most highly regarded private institutions is the Jesuit-operated Ateneo de Manila University. Under Ateneo's auspices and located on its 100 hectare campus is a K-8 school with an enrollment of about 4,000 boys and a **computer education established in 1983**. (Journal Article by Janet J. Palmer; T H E Journal [Technological Horizons in Education], Vol. 20, 1993) Basic education (elementary and secondary schools) in public schools (in the Philippines) may be free but the facilities and educational supplies like books are not entirely free. x x x And, students who may require computer and science laboratories may just be contented with a **single computer unit or borrowed laboratory apparatuses**. x x x Some state universities and colleges (SUCs) have **minimal computer units which are shared among thousands of students**. The ratio of utility can vary from one computer to 10 students (1:10) or one to twenty (1:20) that even Computer Science students have to share units with other students. (Philippine Portal.com)

For some time now, **business processing outsourcing (BPO)** has been reputed to be the fastest-growing industry in the world. The broader industry goes beyond call centers to include other services such as business back office operations, including finance, logistics and accounting; **medical and legal transcription; software development and maintenance; animation**; and engineering and architectural design. Around the world, the industry is seen to be still developing, as more and more organizations discover the cost-saving advantage that come with off-shoring and outsourcing of services. A study by international investment consultancy firm McKinsey & Company valued the potential global market for BPO at US\$450 billion, with only 10 to 12 percent penetrated so far. Hence, the **potential for growth is enormous**. Recent experience also proved the industry to be resilient and relatively recession-proof; when the global economic crisis hit, many companies actually turned to outsourcing as a cost-saving coping mechanism against the downturn. **In the Philippines, the business processing outsourcing (BPO) industry has reportedly been zooming at annual growth rates of up to 46 percent since 2006, with call centers leading the way.** x x x x Right now, the

main obstacle to achieving that growth is a growing shortage of qualified personnel relative to the needs of the industry. The industry requires a relatively high level of education and skills, particularly **HIGH PROFICIENCY IN ENGLISH AND COMPUTER LITERACY**. Except for entry-level jobs in **ANIMATION**, almost all positions in the industry require a college education and additional training in specific areas. The problem is that the bulk of our country's unemployed, numbering some 2 to 3 million, are mostly not qualified for BPO jobs. While jobless Filipinos are predominantly young (80 percent below age 34), statistics show that they mostly attained only a **HIGH SCHOOL EDUCATION** or less. Sustaining growth in this industry therefore requires deliberate efforts to maintain a pipeline of trained qualified workers to respond to the industry's growing demands. x x x (Cielito F. Habito, No Free Lunch, Philippine Daily Inquirer, December 7, 2010, p. A-11)

This representation strongly believes that if this bill will be signed into law, the predominantly young Filipinos will acquire a relatively high level skills in computer literacy and hurdle the growing shortage of qualified personnel relative to the needs of the growing BPO industry which will eventually help our country achieve unprecedented and zooming growth in the said industry.

In this Fifteenth Congress, Representatives Augusto Syjuco and Rosenda Ann Ocampo filed **HB No. 00976** on July 7, 2010 a proposed "Act Mandating the Use of the Proceeds from Gross Receipts Tax Imposed on Cellular Phone Companies to Finance the Computer Literacy Programs of Public Schools and for Other Purposes." This representation is of the firm belief that his bill is complementary to and may be consolidated with HB No. 00976 of Representatives Syjuco and Ocampo and therefore can be heard jointly by the House committee(s) concerned.

The salient features of this bill are as follows: It directs the Secretary of the Department of Education (Secretary of Education) to develop a **two-year comprehensive plans to improve and strengthen public elementary and secondary schools computer science in the Philippines**. This bill mandates such improvements to include: (1) challenging and grade-appropriate academic content standards for computer science; (2) grade-appropriate assessments of computer science learning; (3) programs to increase disadvantaged students' access to computer science courses; (4) public elementary and secondary computer science teacher training programs; (5) improved certification requirements and processes for such teachers; (6) programs to ensure that computer science courses are considered an integral part of the secondary school curriculum; (7) effective computer science curricula; and (8) computer distance learning programs.

This bill also requires the Department of Education to partner with institutions of higher education (IHEs) and non-profit private educational agencies in implementing such measures. Likewise, the bill directs the Secretary of Education to establish a Commission on Computer Science Education to **provide recommendations** to the said Secretary and Congress of the Philippines for expanding and improving computer science in public elementary and secondary schools. It (bill) authorizes the Secretary of Education to award five-year grants, with the approval of the President of Philippines, to IHEs to improve public and secondary schools computer science teacher training.

This bill substantially adopts the **H.R. 5929** entitled "**Computer Science Education Act of 2010**" which was filed on July 29, 2010 and is now pending in the House of Representatives of the United States Congress. This representation firmly believes that the following **findings**, among others, of the U.S. Congress on computer technology in the United States are equally true, relevant, valid and existing also in the Philippines, especially in the public elementary and secondary schools, to wit:

1) Computing technology, driven by breakthroughs in computer science, is an integral part of the culture and is reshaping how people interact.

2) Computer science is transforming industry, creating new fields of commerce, driving innovation in all fields of science, and bolstering productivity in established economic sectors.

3) Computer science underpins the information technology sector of the economy, which is a significant contributor to the economic output

4) The Bureau of Labor Statistics (United States) projects that from 2008 to 2018 more than 1,500,000 high-wage computing jobs will be created in the economy, making high-wage computing one of the fastest growing occupational fields.

5) Computer science is critical for national security and for meeting the challenges that a modern society faces.

6) Providing students with computer science education in elementary and secondary schools is critical for student success in the 21st century and for strengthening the workforce. (Underscoring supplied.)

7) Elementary and secondary computer science education gives students a deeper knowledge of the fundamentals of computing, yielding critical thinking skills that will serve them throughout their lives in numerous fields. (Underscoring supplied)

8) Computer science courses in elementary and secondary schools are fading from the national landscape at a time when they are most needed. The Computer Science Teachers Association (CSTA) has found that introductory secondary computer science courses have decreased in number by 17 percent since 2005 and the number of Advanced Placement (AP) computer science courses has decreased by 33 percent.

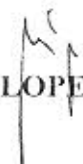
9) The CSTA has found that many States do not have certification process for computer science teachers, and where certification process do exist, such processes often have no connection to computer science content.

10) Computer science education has been encumbered by confusion regarding related but distinct concepts of computer education, technology education, and the use of technology in education.

11) Computer science education courses have often placed within the vocational education pathways in schools, creating a focus on applied information technology skills rather than a focus on developing core computer science knowledge.

12) With the growing importance of computing in society, the need for students to understand the fundamentals of computing, and the significant challenges computer science faces in elementary and secondary education, broad support for computer science education is needed to catalyze reform.

In view of the foregoing, approval of this bill is earnestly sought.


RENE LOPEZ RELAMPAGOS

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AN ACT
TO STRENGTHEN PUBLIC ELEMENTARY AND SECONDARY SCHOOLS
COMPUTER EDUCATION AND FOR OTHER PURPOSES

Be it enacted by the Senate and House of Representatives of the Philippines in Congress Assembled.

SECTION 1. TITLE. - This Act shall be known as "An Act to Strengthen Public Elementary and Secondary Schools Computer Science Education."

SEC. 2. FINDINGS. - The Congress finds the following:

(1) Computing technology, driven by breakthroughs in computer science, is an integral part of the culture of the Philippines and is reshaping how people interact.

(2) Computer science is transforming industry, creating new fields of commerce, driving innovation in all fields of science, and bolstering productivity in established economic sectors.

(3) Computer science underpins the information technology sector of the Philippine economy, which is a significant contributor to the economic output of the Philippines.

(4) The Department of Labor of the Philippines lists that one of the "Hard-to-Fill Occupations" is in cyberservice such as: software development, computer programmers, developers (Software, Web), IT/Information Technology (MIS Developer, Platform Engineer), Specialist (Learning Solution, System and Technical Support), and Animation Artist, Web Designer, Multimedia Artist, Library Builder, Layout Artist, 2D digital animator, Call Center Agent and Medical Transcription. These high-wage computing jobs if created in the Philippines, will make high-wage computing one of the fastest growing occupational fields in our country. In the Philippines, the business process outsourcing process (BPO) industry has reportedly been zooming at annual growth rates of up to 46 percent since 2006, with call centers leading the way. The main obstacles to achieving that growth is a growing shortage of qualified personnel relative to the needs of the industry. The industry requires a relatively high level of education and skills, particularly high proficiency in English and computer literacy.

(5) Computer science is critical for national security and for meeting the challenges that a modern society faces. Of the 14 Grand Challenges for Engineering determined by the National Academy of Engineering of the United States, eight (8) have a predominant or significant computer science component.

(6) Providing students with computer science education in public elementary and secondary schools is critical for student success in the 21st century and for strengthening the workforce.

(7) Public elementary and secondary schools computer science education gives students a deeper knowledge of the fundamentals of computing, yielding critical thinking skills that will serve them throughout their lives in numerous fields.

(8) Computer science courses in public elementary and secondary schools are fading from the national landscape at a time when they are most needed.

(9) The Department of Education does not have a certification process for computer science teachers in public elementary and secondary schools.

(10) Computer science education has been encumbered by confusion regarding the related but distinct concepts of computer science education, technology education and the use of technology in education.

(11) Computer science education courses, if any, have often been placed within the vocational education pathways in schools, creating a focus on applied information technology skills rather than a focus on developing core computer science knowledge.

(12) With the growing importance of computing in society, the need for public elementary and secondary school students to understand the fundamentals of computing, and the significant challenges computer science education faces in public elementary and secondary education, broad support for computer science education is needed to catalyze reform.

SEC. 3. DEFINITION OF TERMS. - In this Act:

(1) **COMPUTER SCIENCE** – The term “computer science” means the study of computers and algorithmic processes and includes the study of computing principles, computer hardware and software design, computer applications, and the impact of computers on society.

(2) **COMPUTER SCIENCE EDUCATION** – The term “computer science education” includes computing education in any of the following:

- (A) Software design.
- (B) Hardware design.
- (C) Creation of digital artifacts.
- (D) Abstraction.
- (E) Logic.
- (F) Algorithm development and implementation.
- (G) Programming paradigms and languages.
- (H) Theoretical foundations.
- (I) Networks.
- (J) Graphics.
- (K) Databases and information retrieval.
- (L) Information security and privacy.

- (M) Artificial intelligence.
- (N) The relationship between computing and mathematics.
- (O) The limits of computation.
- (P) Applications in information technology and information systems.
- (Q) The social impacts of computing.

(3) **INSTITUTION OF HIGHER EDUCATION** – The term “institution of higher education” means an educational institution in the Philippines that –

- (a) admits as regular students only persons having a certificate of graduation from a school providing secondary education, or the recognized equivalent of such a certificate;
- (b) is legally authorized by the Commission on Higher Education (CHED) of the Philippines to provide a program of education beyond secondary education;
- (c) provides an educational program for which the institution awards a bachelor’s degree or provides not less than a 2-year program that is acceptable for full credit toward such a degree, or awards a degree that is acceptable for admission to a graduate or professional degree program, subject to review and approval by the Commission on Higher Education; and
- (d) is a public or other nonprofit private educational institution;

(4) **SECRETARY** – The term “Secretary” means the Secretary of the Department of Education (DepEd).

(5) **STUDENTS UNDERREPRESENTED IN COMPUTING** – The term “students underrepresented in computing –

- (A) means populations historically underrepresented in computer science disciplines; and
- (B) includes females, racial minorities, and low income students.

SEC. 4. COMPREHENSIVE PLANNING. -

(a) **Program Authorized** – The Secretary shall develop comprehensive plans to strengthen public elementary and secondary schools computer science education in the Philippines in accordance with this section.

(b) **Objectives** - A comprehensive plan developed under this section shall outline strategies for achieving the following objectives:

- (1) Provide an engaging and rigorous science education intended to ensure students are prepared for the 21st century.
- (2) Assess the public elementary and secondary schools needs for computer science education, particularly those in rural areas.

(3) Ensure access to computer science courses, particularly at low-performing public elementary and secondary schools and for their low-income students and students underrepresented in computing.

(4) Ensure that students are exposed to grade-appropriate computer science concepts in grade 1 through grade 6 and that computer science courses at the secondary level are viewed as part of the core curriculum students need to be college-and career-ready.

(5) Ensure that teachers have the appropriate background, skills and access to resources to teach computer science.

(c) Contents of Comprehensive Plans – The comprehensive plan that shall be developed by the Secretary under subsection (a) shall include the following:

(1) An assessment of the public elementary and secondary schools computer science education in the Philippines.

(2) Proposals to improve public elementary and secondary schools computer science education in the Philippines through the development and implementation of

(A) challenging and grade-appropriate academic content standards for computer science at elementary and secondary education levels;

(B) grade-appropriate assessments of computer science learning;

(C) programs to increase access to computer science courses for students of low-performing elementary and secondary schools and students underrepresented in computing;

(D) improved computer science teacher certification requirements and processes;

(E) professional development programs for computer science teachers; and

(F) programs for ensuring that computer science courses at the secondary level are considered part of the curriculum students need to be well prepared for higher education and employment.

(d) Consultation – In developing a comprehensive plan under this section, the Secretary shall collaborate with representatives of institutions of higher education, Department of Science and Technology and with other interested parties.

SEC. 5. COMMISSION ON COMPUTER SCIENCE EDUCATION. -

(a) Commission – Not later than 90 days after the enactment of this Act, the Secretary shall establish a Commission, to be known as “Commission on Computer Science Education” (in this section referred to as the “Commission”), to provide recommendations for expanding and improving computer science education.

(b) Membership - The Commission shall consist of not more than 10 members and shall include at least one of each of the following to be chosen by the Secretary:

(1) A senior official, preferably an Undersecretary or Assistant Secretary, from the Department of Education. This official shall act as presiding officer of

meetings that may be called by him to accomplish the purposes and objectives for which the Commission is established.

(2) An expert in computer science preferably from the Department of Science and Technology.

(3) A representative of an elementary or secondary computer education practitioner organization.

(4) An public elementary or secondary computer science teacher.

(5) A social scientist with expertise on equity issues in the field of computer science.

(6) A representative of the computing industry or an industry that depends on computing services.

(c) Review – The Commission shall –

(1) review the state of public elementary and secondary computer science education in the Philippines; and

(2) review the state of computer science teacher certification requirements in public elementary and secondary computer education in the Philippines.

(d) Meeting of the Commission – Within 270 days after the date on which the Commission is established, the Commission through its presiding officer, may call meetings to accomplish the objectives and purposes in subsections (a), (c) and (e) of this Section. The presiding officer and the members of the Commission shall receive a per diem for each meeting duly called by the presiding officer of the Commission and actually attended by them: Provided, That such per diems shall not exceed ten (10) thousand pesos (P10,000.00) during any one month for each member: Provided, further, That no other allowances or any form of compensation shall be paid them except actual expenses in traveling to or from their residence to attend the Commission meetings.

(e) Report - Not later than 270 days after the date on which the Commission is established, the Commission shall submit to Congress and the Secretary a report containing the results of the review under subsection (c). Such report shall include -

(1) recommendations on best practices for computer science instruction, teacher preparation, and professional development;

(2) recommendations on best practices for computer science teacher certification, including recommendations on achieving congruence between public computer science teacher certification standards and the content of teacher preparation programs offered by institutions of higher education; and

(3) recommendations for expanding capacity –

(A) to help public elementary and secondary school students understand computer science, the job opportunities available to those who pursue computer science education, and the importance of computer science in the economy;

(B) to strengthen computer science education in the elementary and secondary public education system in the Philippines; and

(C) to increase participation in computer science among students underrepresented in computing.

(f) Termination – Unless extended by the Secretary, the Commission shall terminate on the date that is sixty (60) days after the date of the submission of the report required under subsection (e).

SEC. 6. MODEL TEACHER PREPARATION PROGRAMS. -

(a) Model Teacher Preparation Programs – The Secretary, with the approval of the President of the Philippines, may award grants to institutions of higher education (IHEs) to improve public elementary and secondary schools computer science teacher training which shall be taken from the current appropriations of the Department of Education under the General Appropriations Act.

(b) Eligible Activities – A grant received under subsection (a) of this section shall be used to carry out at least one of the following activities:

(1) Development of courses for undergraduate students that -

(A) prepare such students to teach computer science at the public elementary and secondary level;

(B) address content and pedagogy in computer science education; and

(C) engage teacher education and other relevant departments at such institution of higher education.

(2) Development and support of mentoring programs to support computer science teachers in public elementary and secondary schools who are new to the profession.

(c) Duration of Grants – Each grant awarded by the Secretary under this section shall be for a period of five (5) years.

(d) Limitations – The Secretary may not award grants under this section before the earlier of the date of the submission of the report of the Commission on Computer Science Education required under section 5 (e), or the date that is one year after the date of the enactment of this Act. The Secretary shall consider such report, if available, in awarding grants under this section.

SEC. 7. NATIONAL EVALUATION. -

(a) In General – Not earlier than four (4) years after the date of the enactment of this Act, the Secretary shall contract with an independent organization for a comprehensive, scientifically valid, and quantitative evaluation of the performance and effectiveness of the activities funded by grants received under this Act in improving the availability and quality of computer science education in public elementary and secondary schools, the overall participation rates of public elementary and secondary students in computer science courses, and the participation rate of students underrepresented in computing in computer science courses.

(b) Reporting Requirements –

(1) INITIAL REPORT – Not later than five (5) years after the enactment of this Act, the Secretary shall submit to Congress a report on the results of the evaluation described in subsection (a).

(2) **REPORT UPDATES** – Not later than two (2) years after the date on which the Secretary submits the initial report required under paragraph (1), and biennially thereafter, the Secretary shall submit to Congress an update of such report.

SEC. 8. APPROPRIATIONS. - The amount necessary for the effective implementation of this Act shall be charged to the appropriations of the Department of Education. Then, such sum as may be necessary for the continued implementation of this Act shall be included in the annual General Appropriations Act.

SEC. 9. RULES AND REGULATIONS. - The Department of Education shall issue the necessary rules and regulations for the effective implementation of this Act not later than six (6) months after the enactment of this Act.

SEC. 10. SEPARABILITY CLAUSE. - If any provision or part of this Act is declared invalid or unconstitutional, the remaining parts and provisions not affected shall remain in full force and effect.

SEC. 11. REPEALING CLAUSE. - All laws, decrees, executive orders, presidential decrees, rules and regulations contrary to or inconsistent with the provisions of this Act are repealed or modified accordingly.

SEC. 12. EFFECTIVITY. - This Act shall take effect fifteen (15) days after its publication in the Official Gazette or in at least two (2) national newspapers of general circulation.

Approved,