1988

Development of an Integrated Human Science Course for Science Credit in the Indianapolis Public Schools

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Recommended Citation
Hicks, Rosie L. (1988) "Development of an Integrated Human Science Course for Science Credit in the Indianapolis Public Schools," Journal of Health Occupations Education: Vol. 3 : No. 1 , Article 7. Available at: https://stars.library.ucf.edu/jhoe/vol3/iss1/7
Abstract: For the first time, in the state of Indiana, a model and precedent for meeting minimum high school science graduation requirements with a health occupations program has been accomplished. Because of the national and state thrust on improving education by increasing requirements for graduation and for sciences in particular, this model was developed to facilitate student completion of science courses prior to in-depth health occupations coursework. The Indianapolis Public Schools were granted permission to offer a four semester, eight-credit Integrated Human Studies course at the Health Professions Center during the summer of 1987. The course provides four credits in the area of science (biology and chemistry) and four credits in the health professions area under vocational-technical education. The course reorders biology, chemistry, and Introduction to Health Professions content so that, whenever possible, students will find immediate

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Published by STARS, 1988
Development of applications of science content in health professions skills they are learning concurrently. Students will use the four science credits towards minimum science high school graduation requirements.

Background

Education is on the forefront of our nation’s agenda for the 80s. The influence of this agenda is evident throughout state and local levels. Because of this urgent concern for education of our children, many states are actively involved in improving quality of education for their youth. So it is in Indiana through intense educator emphasis on increasing graduation requirements, on the state A+ program and, in the area of the sciences (Evans, 1987). This concern led to development of an Integrated Human Studies course that would facilitate health occupations students taking science courses prior to their in-depth health occupations coursework.

Overview of Health Professions Magnet Programs

The Indianapolis Public School System has four Magnet Programs located at three of its high schools. These programs are: (a) The Career Center, (b) Center for the Humanities, (c) Health Professions Center (HPC), and (d) The School of Performing Arts. A Magnet Program is funded in part by a federal grant and in part by state vocational monies, if the program is a vocational program. Development of each of the Magnet Programs is a joint responsibility of the comprehensive school principal and staff in the curriculum division of the Indianapolis Public School Education Center.
Faculty have expertise in a wide variety of job-related skills and most are licensed and practicing specialists. Facilities are designed for special kinds of instruction (Adams, 1984).

Magnet Programs provide every student with opportunities for entry into postsecondary college level preprofessional programs and/or for marketable skills for full or part-time employment. Each program is designed to fit expressed interests and abilities of students and encourages students to demonstrate competency in tasks directly related to, and used in, specific jobs.

A Magnet School or Center provides an elective, four-year program which is located in school facilities and uses special community resources with the school curriculum. Students enrolled in a Magnet School or Center may attend on a full- or part-time basis. A full-time student completes all other courses at the Magnet School. However, the part-time student completes all other high school course requirements at the home school. Transportation is provided for part-time students.

Class size is limited for each Magnet Program. Students must apply for admission to specific Magnet Programs of their choice and meet criteria for acceptance set by individual programs. Grading focuses on observable skills and the student must demonstrate minimal competency.

The Health Profession Center

The HPC was implemented in September of 1979 as part of the Indianapolis Public Schools’ desegregation plan. The purpose of the HPC was to develop a
specialized curriculum in one high school to help students make an informed choice about careers in the health professions. Initially, the program was located at Crispus Attucks High School; but was moved to Arsenal Technical High School as part of a district wide reorganization plan in September 1986. A 3 million dollar renovation project created a suite of new rooms for the Health Professions Center; the facility provides classrooms for dentistry, laboratory technology, patient care, introduction to health careers, and additional rooms for material storage and preparation.

The facility is located near nine hospitals, two large universities including the Indiana University School of Medicine and Dentistry and the Purdue University School of Science, and five major research centers:

(a) the Indianapolis Center for Advanced Research, (b) the Hudson Institute, (c) the Regenstrief Center for Physical Therapy, (d) the Fortune-Fry Center (research in ultra-sound imaging), and (e) the National Sports Medicine Research Center. Curriculum and staff development have been strengthened through formation of a strong and viable advisory committee consisting of individuals from health care agencies, higher education, and the Indianapolis Chamber of Commerce (Health Professions Center Proposal, 1986). Ample time is available in a four-year high school program to meet academic graduation requirements and to elect the four years of HPC’S courses.

Units of Instruction

Units of instruction are written by health professionals and include essential job entry skills in a health career. The initial course,
Introduction to Health Professions, meets also the Indiana Department of Education’s graduation requirement for the health course. Each unit identifies three to five specific skills and the level of performance required on a mastery test when the student is ready to be tested. The unit also recommends specific acclivities and resources that are to be used. Each unit can be self-instructional and students are encouraged to use the unit to guide their own study. All units require average reading comprehension at the seventh grade level (Adams, 1981).

Instruction in the HPC is competency based and criterion-referenced. Each objective is tied directly to a job title or job task and is introduced to students as part of an instructional unit. Learning objectives are sequential; those mastered in entry courses are not repeated in advanced level courses. Continuous progress is encouraged for all students; objective mastery is on a can do/continue or can’t do/restudy continuum. Grades are pass-fail. Demonstration of skills in classroom stimulations initiates competency development; performance of skills with real patients in hospitals, nursing homes, or outpatient clinics measurably improves confidence and competency. On-the-job experiences are available for up to four hours per day for students who have completed six semesters of the program.

Admission Criteria

In September 1984, admission criteria established for program entry included scores at or above the student’s grade level on subtests in math, science, and reading comprehension, as measured by the Iowa Test of Basic
Development of Skills. Prior to that date the entrance requirement stipulated that a student needed only to have an interest in a career in health professions.

Management, Staff and Support Activities

The HPC is managed by school principal and a part-time Director who also teaches. Each HPC staff member is a licensed registered or certified professional. Licenses and certifications include such specialties as Licensed Practical Nurse, Dental Assistant, Registered Nurse, Medical Technologist, and Medical Laboratory Technician. Curriculum development and academic support activities are coordinated by the science supervisor for the Indianapolis Public Schools, staff training and vocational relationships are coordinated by the supervisor of vocational programs for the Indianapolis Public Schools (Health Professions Center Grant Proposal, 1986).

Background information has been provided to help the reader better understand operations and management of the HPC, its design and relationship to a broader system, namely, the Magnet Programs and the Indianapolis Public School System respectively.

Rationale for Development of Human Science Course

Enrollment in the HPC began to decline in 1983 (Adams, 1984). As a result of interviews and of a survey of teachers and staff about introduction to the Health Professions Center, enrollment decline was attributed partly to lack of awareness by high school counselors regarding HPC course preparation. It was felt by teachers and staff that fewer and fewer academically talented students were entering the program. The HPC is also a
vocational program. As such it is hampered by counselors who do not recognize relevance, and importance of an interest in science and science-related courses prior to or during studies in the HPC. Requirements for a basic foundation in science and science-related courses also should be recognized by counselors. It was feasible, to them, for students to complete their science graduation requirements any time before graduation, even until the very end, such as during the junior or senior years. This, many times, would be after all HPC studies were over except for the cooperative experiences. Many HPC students had not prepared themselves adequately in the sciences to succeed in their advanced HPC coursework. Because of the difficulty of advanced studies in HPC, students lacking science courses were faced with such anxiety and frustration that they became discouraged and chose to leave the program. Thus, the purpose for developing this course was to provide the HPC student with the science background needed for indepth studies.

Therefore, the curriculum staff decided that the integrated course would be taught during the freshmen year to replace the Introduction to the Health Professions Center-course. The integrated course would be a combination of science (biology and chemistry) and health professions content, skills, and careers. The intent was to satisfy science requirements for graduation and at the same time provide the basic background necessary to help students pursue their studies in the HPC program more successfully and effectively. It would also assure that science was taken prior to indepth studies in the HPC and the integrated approach would simultaneously introduce students to
Development of the health professions and maintain their interest level while emphasizing relationships between science and health professions.

**Development of Integrated Course**

Many hours of planning, developing, and revising were consummated in the development of the integrated course. The first task undertaken in developing the integrated course was organization of ideas. A listing of skills required by health professionals was developed using the technical report published by the Indiana State Board of Vocational and Technical Education (Project HOPE, 1977). In 1974, in Indiana, Project HOPE’s technical report, was used to develop a comprehensive competency based Health Occupations Education program. Competencies (knowledge, skills, or behaviors) were devised and validated by job incumbents. In the performance based student training component, the report identified job titles and skills in the Allied Health field for which training could be provided at secondary and postsecondary, but less than baccalaureate, levels. The validated task inventory for each of the identified job titles was used and the skills were sorted into three categories for each health profession: entry, technical, and professional skills. Entry level skills were minimal, job entry level skills required in each profession; technical skills were those additional skills that equip and prepare for certification, and professional skills were those that prepare for postsecondary study in the health professions.

Content was identified for these skills in the health professions and matched to science (biology and chemistry) content. For example, the biology

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Development of topic, Protists, was matched with the health processions content, Infectious Diseases. Content and skills were reviewed by the science supervisor for Indianapolis Public Schools and the Advisory Committee for the health Professions Center. Upon receiving their approvals, further development of the Integrated Human Studies course progressed.

In the HPC, each course contains a specific number of instructional units. More than 200 units have been developed by Health Professions Center staff. A particular course may be composed of 20 or more of these units.

In the previous course, Introduction to Health Professions, there are approximately 20 self-instructional units. These units were matched topic-by-topic with science (biology and chemistry) content. Course descriptions and objectives for each topic were written. Each topic included objectives that were a combination of both science (biology and chemistry) and health professions content. Table 1 presents examples of objectives inclusive of both science and health professions content.

Pilot Course

Beginning with the 1986-87 school year, a pilot course was taught to freshmen students. The course using a teaching approach, was taught by a licensed science teacher from the science department and a licensed and certified health professional from the HPC. The Integrated Human Studies course met two hours per day over two semesters.
Table 1

Objectives Inclusive of Both Science and Health professions

| The Nervous System, Reflexes, Brain and Sense Organs |

*1. Explain the functions of a nervous system.
*2. Define the word stimulus.
*3. Describe the structure of a neuron and give the function of each of its parts.
*4. Define reflex and give examples of reflexes that are helpful.
5. Explain how reflexes work.
6. Discuss how brain imaging is used in diagnosis.
7. Relate pressure and dynamics to the function of cerebrospinal fluid.
8. Discuss the preparation, care and need for a lumbar puncture.
9. List the various types of serologic, microscopic, chemical and *microbacteriologic* examinations performed on *csf*.
10. Describe the formation, clinical diagnosis and treatment for meningitis and polio.
11. Describe the formation, clinical diagnosis and treatment for *neuroblastomas* (retina, ganglia).
12. List *the steps of light in the pathway through the eye* to the brain.
13. Identify at least five career opportunities in the profession of visual rehabilitation.
14. Discuss the required type of training and duties performed by each career area identified in visual rehabilitation.
*15. Describe the parts and function of the eye and describe the various eye disorders.

**SKILL/ACTIVITIES:**

1. Perform simple reflexes such as knee, elbow, and toe.
2. Perform *Snellen* eye test and calculate vision.
3. Test hearing with a tuning fork.

*Science Component*

At the end of the school year, from *results* of test performance by students (written and practical) and evaluations made by teachers, three
problem areas were defined. First, science teachers felt they had inadequate time to provide instruction in necessary content areas. Second, because of the perceived lack of science preparation in comparison to that of their co-workers, health professionals felt inadequate in making suggestions of application that could be included in the science lesson. In addition, combined lesson preparations with both teachers working together were lacking, resulting in science instructors controlling lesson content. Thus, lessons were directed toward the sciences rather than toward integration of the science with health education content. The third problem was time. Teachers from both areas vied for adequate time. In many instances, teachers rotated individually with the class so that health professions could be discussed. This reduced the amount of time devoted to each topic designed into the instruction and affected possibilities for integrated approaches.

During the summer of 1987, revisions were made in the course. The combined objectives (science and health professions) were revised topic-by-topic. The science objectives were matched with state science proficiencies. Because more instructional time was needed, the Integrated Human Studies course was made a four-semester course and divided into Integrated Human Studies I, II, III, and IV. Integrated Human Studies I and II are biology components integrated with health professions and Integrated Human Studies III and IV are chemistry components integrated with health professions.

Several meetings were held with the State science supervisor in which objectives were analyzed, reviewed, and revised as needed. After these
Development meetings, the State science supervisor approved the course and the state vocational, education consultant reviewed the final product and presented the course to the State Board of Education for the purpose of requesting science credits.

In July of 1987, the State Board of Education granted the Indianapolis Public Schools permission to offer a four-semester, eight-credit Integrated Human Studies course as part of its science program with four credits in health professions and four credits in science. Students who successfully complete the course will use the four science credits to fulfill the minimum high school science graduation requirements.

Initiation of Integrated Human Science Course

Beginning with the 1987-88 school year, the Integrated Human Studies course was initiated. During the first and second semesters of the program, students were taught for one class period by a Licensed biology teacher and one class period by a Licensed and certified health professions teacher.

During the third and fourth semesters of the program, students will be taught one class period by a licensed chemistry teacher and one class period by a licensed and certified health professions teacher.

Conclusions

The Integrated Human Studies course has met state requirements for science. It also meets needs of students to complete science prior to their in-depth health professions coursework. Efforts of the Indianapolis Public
Schools can be used as precedents for other Health Occupations programs which desire to receive science credits through their programs.

Teachers involved in instruction of the Integrated Human Studies course attended an inservice in August of 1987. They received instruction in how to integrate and use the text, course guide, and the previously used, Introduction to Health Professions self-instructional units. Activities, lesson plans, and syllabi were prepared to be used by teachers and students.

Developmental activities are continuing and testing materials are being developed. This course will be evaluated in three years by the Indiana State Department of Education. An internal evaluation team is preparing an evaluation model to be used by the Health Professions Center to evaluate the program on a more frequent basis.

References


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