Using VIDI-X Microcomputers in High School and College Education

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Abstract - This paper describes the application of the VIDI-X development microcomputer for educational purposes. VIDI-X is a platform developed entirely in Croatia and another great way to popularize STEM and learn new skills. VIDI-X is based on a dual-core ESP 32 processor and comes with a temperature sensor, a microphone, and a 2.8" touch screen. The possibilities of connection and application are enormous considering the diverse communication possibilities (Wi-Fi, Bluetooth, IR). VIDI-X is a significantly more powerful platform than Arduino, and unlike the Raspberry Pi computer, it does not need an operating system, and it can be programmed on a Windows, Linux, or Mac OS computer. It is possible to work in Python, C, C++, JavaScript, and other popular programming languages. Our students first installed the Arduino IDE on their laptops, and then connected the laptops to VIDI-X, and a series of exercises followed that combine the use of software and hardware. Our experience with this platform in the undergraduate computing curricula, at both the high school and college levels is presented here.

Keywords - *VIDI-X, ESP 32, STEM, Education,*

I. INTRODUCTION

VIDI Project X was presented on December 5, 2019 in Croatia at conference for innovative projects awards powered by VIDI magazine. The whole project was developed by the VIDI media company in cooperation with a number of Croatian technology companies that financed the project.

VIDI-X is a microcomputer board that in its vision combines the "dream" and "realize" phases of the project, which we believe also requires innovation. The definition could be many, depending on the purpose you use it for. On VIDI-X microcomputer it is possible to run the original Doom or Duke Nukem in the emulator. You can connect additional sensors and manage the smart home system, you can use its Wi-Fi and Bluetooth communication capabilities to connect to an external system.

VIDI-X makes good use of the capabilities of the powerful dual-core ESP32 processor, so it can serve as a multifunctional microcomputer or as a development board,

as an efficient HUB for a cluster of sensors or for some completely new purpose that is expected from the community that will gather around it to design.

Why did we choose VIDI-X microcomputer for education purpose at both the high school and college level? We wanted more powerful platform, totally new and completely developed in our country - Croatia. We already have experience with other widely used microcomputers boards like Arduino and Raspberry Pi microcomputers in education [4][6].

VIDI-X is a significantly more powerful platform than Arduino, and unlike a Raspberry Pi computer, it does not need an operating system. To run, a power source is required via a 3xAA battery or via USB cable, and it can be programmed on a computer with Windows, Linux or Mac OS system. Since its introduction, VIDI-X soon became very popular in Croatia also in the education, especially in STEM field [1] [7].

In II. chapter VIDI-X hardware and programming environment is described in detail. The examples of VIDI-X projects, that were introduced at laboratory exercise course in High school Tesla in Zagreb are shown in III. Chapter. The VIDI-X micro server project, that was used for demonstration in the *Computer Network course* at the College for Information Technologies - VSITE in Zagreb is described in last chapter of this paper.

II. VIDI-X HARDWARE AND PROGRAMMING

The VIDI-X development microcomputer is based on an ESP32 processor, a 2.8" integrated screen, a light sensor, an IR sensor, a temperature sensor, integrated speaker and the possibility of Wi-Fi, IrDA and Bluetooth connectivity.

Here is a quick overview of main parts od VIDI-X microcomputer The parts are numbered from 1 to 21 and are indentified on the front and the back side of VIDI-X as shown in Figure 1. and Figure 2.

Using Microcomputers In School Administration

California. State Department of Education

Using Microcomputers In School Administration:

Using Microcomputers in School Administration Eugene T. Connors,Thomas C. Valesky,1986 This fastback outlines the steps to take in computerizing school administration After an introduction that lists the potential benefits of microcomputers in administrative offices the booklet begins by delineating a three step process for establishing an administrative computer system 1 creating a district level committee of administrators counselors librarians special education teachers at least one computer expert and other end users to identify school administrative functions best suited for computerization 2 to locate appropriate computer software to accomplish the administrative tasks that have been identified and 3 to select the hardware that will run the software that has been chosen The second chapter selecting software discusses stand alone versus integrated programs disk operating systems word processing database management spreadsheets accounting data analysis and graphics and special applications The third chapter selecting hardware discusses 8 bit machines 16 bit machines computer power peripheral devices and vendors The final chapter addresses the problem of getting started and discusses consultants establishing priorities staff training and the logistics of transferring to a computerized system TE   An Administrator's Guide to Microcomputer Resources Gale Zahniser,James P. Long,Leonard O. Nasman,1983

Microcomputers in School Administration David Lancaster,1983   *Microcomputers in School Administration* Patrick Bird,1986   **The Use of Microcomputers in School Administration** A. F. Blake,1982   **Microcomputers in Voc Ed** Gale Zahniser,James P. Long,Leonard O. Nasman,1983   **Microcomputers for Use in School District Administration** California. State Department of Education,1987   *An Administrator's Manual for the Use of Microcomputers in the Schools* Harold Miller,1988   **Resources in Education** ,1988   **Management and Planning Issues in the Use of Microcomputers in Schools** David Lancaster,1985 UNESCO pub Research paper on the use of microcomputers for teaching purposes computer assisted instruction and for school management with partic Reference to Asia and Pacific examines reasons for the growth of microcomputer use incl The training employment relationship and its impact on pupil Motivation curriculum development and teaching methods discusses microcomputer equipment costs and the need for cost benefit analysis Bibliography   Microcomputers in Education Lee Marvin Joiner,1982   **Instructional Strategies for Using Microcomputers in Vocational Education** Judith Rodenstein,1985   *Improving Instruction with Microcomputers* John H. Tashner,1984   **Microcomputers and the Classroom Teacher** Gail A. Caissy,1987 This monograph for teachers addresses two emerging areas in the computing field providing inservice training in microcomputer use for the general teaching population and integrating the use of microcomputers into the overall curriculum A brief discussion of why computers should be used in the classroom introduces five chapters which provide overviews of the following topics 1 the use of computers in teaching and learning areas of computer use and using the computer as a teaching learning tool 2 types of software available for schools computer assisted instruction software applications software and databases 3 integrating

computers into the classroom 4 developing a plan for using computers in the classroom setting up a classroom computer center and working with only one computer in the classroom and 5 evaluating educational software general questions questions about instructional design and questions about physical characteristics of the program A concluding statement argues that the key to continued growth and expansion in the educational computing field lies with classroom teachers and urges them to take an interest in computers and begin to use this important new tool in their classrooms A 71 item reference list concludes the document EW   Microcomputer Software Use in School District Business Offices ,1989   Educational Administration ,1993   **School Administrator's Introduction to Instructional Use of Microcomputers** David Moursund,1983   Microcomputers in the Schools James L. Thomas,1981   **Microcomputers in Education** Katherine Clay,1982 Designed to put educators in touch with the literature people and resources that will keep them informed of the current and future state of the art in computer education this guide provides citations from 1976 through March 1982 compiled from computer searches of ERIC Magazine Index and Newspaper Index and from manual searches of Education Index Microcomputer Index and the library and information files of the San Mateo Educational Resources Center Each section begins with a brief introduction Within each section citations are arranged by document format journal and newspaper articles microfiche documents and books and reports A list of acronyms is included Individual chapters focus on the following topics futures trends computer literacy philosophy classroom applications management applications selection evaluation criteria teacher administrator education research studies home computers and references resources An appendix lists additional information sources and author and subject indexes are provided LMM   **Classroom Applications of Microcomputers** Robert V. Bullough,LaMond F. Beatty,1991

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