

Development of Digital Maker Education from Elementary School to University

(Courtesy of Zong-Hua Cai at the Division of Student Affairs and Campus Security)



To improve teachers' teaching ability in digital maker education, the Ministry of Education has entrusted the National Kaohsiung Normal University (NKNU) as the general coordinator in the promotion of the STEM + A Course-Oriented Digital Maker Education Development Program. With the integration of three subprograms in northern, central, and southern Taiwan and the bases in line with the “star- planet-satellite” model, schools with the willingness to participate are guided to implement digital maker education. Sun-Lu Fan, Political Deputy Minister of Education, said that we were currently in a hands-on era and that the development of digital maker education into formal courses and the common version of teaching aids were very helpful for teaching sites in the front line. Schools that have received subsidiaries for teaching aids will, in the initial period, incorporate the common teaching aids developed by universities into their instruction under the new curriculum guidelines. It is expected that, eventually there will be at least 72 "micro courses" being developed, incorporating digital maker education in various subject areas at the end of the year.

Fu-Yuan Peng, Director-General of K-12 Education Administration of the Ministry of Education also encouraged all senior high schools to participate actively. Among them, National Yeong-Jing Industrial Vocational High School (YJVS) in Changhua County participates in the subprogram in central Taiwan; the teachers are being provided with guidance and support by the bases at the “star” level staffed by personnel from NKNU and the National Chung Hsing University (NCHU). YJVS functions as a base at the “planet” level to recruit neighboring schools to join the subprogram and to organize teacher training sessions locally, while bringing together elementary and junior high school teachers from neighboring townships, including Yongjing, Yuanlin, Dacun, Tianwei, Shetou, Xizhou, and Fangyuan, to form a seed teacher community to discuss and design courses once a month. The NKNU and NCHU teams develop the common version of teaching materials and courses, while seed teachers of each school introduce micro-courses or clubs under the new curriculum guidelines into their schools, and convert them into teaching materials for students through collaboration in seminars held during the semester. For example, the "Motor Sensor" course allows students to understand basic programs and concepts of digital makers; while in "Crawler Track and Electric Vehicle Teaching Aid Platform" course, students can take hand-on design approach to engage in obstacle by-passing, tracking, and labyrinths design using the vehicles they make to cultivate their logical and numerical control abilities, thereby advancing their computing thinking, and programming ability. It is expected that the Internet of Things interface and functions will be applied to subjects, such as "Smart Home" in the future. As such, computing thinking will be cultivated persistently through hands-on activities from elementary school all the way to university, which will in turn improve their problem-solving ability.