











attended by students in cluster 1 is software development, with a proportion of 67%; clusters 2 and 3 are the design and analysis of information systems.

This study implements the K-Means algorithm for student demographic clustering based on the ICFL program. The data used focuses on 83 students and examines variables such as gender, GPA, university admission selection pathways, history of ICFL sub-program categories followed, and semester in which ICFL was taken. The resultant clusters can be categorized into three groupings based on the study conducted. The elbow method calculates the inertia, or the total value of the distance between each point and the nearest centroid, which is used to determine the number of clusters. The ICFL - Internship program is the most popular ICFL program among the three clusters, with over 40% of participants from each cluster participating. This demonstrates that the ICFL internship program is the most popular among students and is a valuable asset in starting a post-college career.

#### REFERENCES

- [1] Beritasatu.com, "MWA UI Holds Webinar Series on Economics to Health," 2021. <https://www.beritasatu.com/nasional/724771/mwa-ui-gelar-webinar-series-ekonomi-hingga-kesehatan>. (accessed Dec. 23, 2020).
- [2] Directorate General of Higher Education, *Independent Campus, Freedom to Learn Guide Book*. Jakarta: Directorate General of Higher Education, 2020.
- [3] S. Nurhayati and P. Puryati, "Assessment fairness in freedom of learning in open and distance education," *Research and Evaluation in Education*, vol. 8, no. 1, Jun. 2022, doi: 10.21831/reid.v8i1.45378.
- [4] Directorate General of Higher Education, "About Independent Campus Freedom to Learn," 2020. <https://kampusmerdeka.kemdikbud.go.id/web/about>. (Accessed Dec. 23, 2021).
- [5] A. Junaidi, *Panduan Penyusunan Kurikulum Pendidikan Tinggi Di Era Industri 4.0 Untuk Mendukung Merdeka Belajar-Kampus Merdeka*, IV. Jakarta: Direktorat Jenderal Pendidikan Tinggi Kementerian Pendidikan dan Kebudayaan, 2020.
- [6] K. Hartley and L. D. Bendixen, "Educational Research in the Internet Age: Examining the Role of Individual Characteristics," *Educational Researcher*, vol. 30, no. 9, pp. 22–26, 2001, doi: 10.3102/0013189X030009022.
- [7] D. R. Garrison, "Self-Directed Learning and Distance Education," in *Handbook of Distance Education*, M. G. Moore and W. G. Anderson, Eds. New Jersey: Lawrence Erlbaum Associates, Inc., 2003, pp. 161–168.
- [8] C. N. Gunawardena and M. S. McIsaac, "Distance Education," in *Handbook of Research on Educational Communications and Technology*, 2nd ed., D. Jonassen and M. Driscoll, Eds. New York: Lawrence Erlbaum Associates, Inc., 2004, pp. 355–395.
- [9] W. C. Diehl, "Charles A. Wedemeyer," in *Handbook of Distance Education*, Routledge, 2015. doi: 10.4324/9780203803738.ch3.
- [10] D. Ktoridou and E. Doukanari, "Task-based internships: Fostering ideal learning through focused experience," in *Proceedings of 2017 IEEE Global Engineering Education Conference, EDUCON 2017*, Jun. 2017, pp. 1717–1722. doi: 10.1109/EDUCON.2017.7943081.
- [11] P. C. Ooi, "Exploring ways to enhance students' internship experience," in *2016 IEEE 8th International Conference on Engineering Education (ICEED)*, 2016, pp. 107–108. doi: 10.1109/ICEED.2016.7856052.
- [12] S. Yamamoto, "The effect of an internship experience in Japan on Thai students' choice of employment," in *2018 5th International Conference on Business and Industrial Research (ICBIR)*, 2018, pp. 500–505. doi: 10.1109/ICBIR.2018.8391249.
- [13] G. Rulifson and A. Bielefeldt, "Influence of Internships on Engineering Students' Attitudes about Socially Responsible Engineering," in *2018 IEEE Frontiers in Education Conference (FIE)*, 2018, pp. 1–6. doi: 10.1109/FIE.2018.8658647.
- [14] F.-M. Sui, J.-C. Chang, and H.-C. Hsiao, "What Core Competence Can Students Learn from Off-Campus Internship?," in *2020 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*, 2020, pp. 640–644. doi: 10.1109/IEEM45057.2020.9309781.
- [15] M. Moltó-Aribau, A. T. Tarruella, and A. Vendrell-Vilanova, "Designing a Competency-Based Evaluation Model in External Academic Practices (Internship)," in *2018 IEEE Frontiers in Education Conference (FIE)*, 2018, pp. 1–4. doi: 10.1109/FIE.2018.8658675.
- [16] L. Andrade-Arenas and C. Sotomayor-Beltran, "On the Perspectives of Graduated Engineering Students on Three Dimensions of the Integrated Curriculum from a Peruvian University," in *2019 International Symposium on Engineering Accreditation and Education (ICACIT)*, 2019, pp. 1–4. doi: 10.1109/ICACIT46824.2019.9130268.
- [17] S. Chickerur, "Engineering Internships with Projects: A Workplace-Learning Model for Improving Student's Success and Performance," in *2015 8th International Conference on u- and e-Service, Science and Technology (UNESST)*, 2015, pp. 45–49. doi: 10.1109/UNESST.2015.21.
- [18] S. Andari, A. C. Setiawan, and A. Rifqi, "Student Exchange Program Of Merdeka Belajar-Kampus Merdeka ( MBKM ) In Covid-19 Pandemic," *Education and Learning Journal*, vol. 28, no. 1, pp. 30–37, 2021.
- [19] S. McKay, L. Lannegrand, J. Skues, and L. Wise, "Identity Development During Student Exchange: A Qualitative Study of Students' Perspectives on the Processes of Change," *Emerging Adulthood*, vol. 10, no. 2, pp. 420–433, 2022, doi: 10.1177/2167696820969464.
- [20] K. Govindasamy, A. V. Vidyapeetham, and V. Thambusamy, "Analysis of Student Academic Performance Using," *International Journal of Pure and Applied Mathematics*, vol. 119, no. November, pp. 309–323, 2018.
- [21] V. K. Anand, S. K. A. Rahiman, E. Ben George, and A. S. Huda, "Recursive clustering technique for students' performance evaluation in programming courses," in *2018 Majan International Conference (MIC)*, 2018, pp. 1–5. doi: 10.1109/MINTC.2018.8363153.
- [22] Z. Fan and S. Yan, "Clustering of College Students Based on Improved K-Means Algorithm," in *2016 International Computer Symposium (ICS)*, 2016, pp. 676–679. doi: 10.1109/ICS.2016.0139.
- [23] X. W. Su *et al.*, "A survey of attitudes to and demands on internship in graduates majoring in preventive medicine in 6 colleges and universities in China," *Zhonghua liu xing bing xue za zhi*, vol. 40, no. 7, p. 849–853, Jul. 2019, doi: 10.3760/cma.j.issn.0254-6450.2019.07.021.
- [24] I. Singh, A. S. Sabitha, and A. Bansal, "Student performance analysis using clustering algorithm," in *2016 6th International Conference - Cloud System and Big Data Engineering (Confluence)*, 2016, pp. 294–299. doi: 10.1109/CONFLUENCE.2016.7508131.
- [25] D. Aggarwal and D. Sharma, "Application of Clustering for Student Result Analysis," *International Journal of Recent Technology and Engineering (IJRTE)*, vol. 7, no. 6C, 2019.
- [26] D. Kuswandi, E. Surahman, Z. Zufar At Thariq, and M. Muthmainnah, "K-Means Clustering of Student Perceptions on Project-Based Learning Model Application," in *2018 4th International Conference on Education and Technology (ICET)*, 2018, pp. 9–12. doi: 10.1109/ICEAT.2018.8693932.
- [27] I. Pasina, G. Bayram, W. Labib, A. Abdelhadi, and M. Nurunnabi, "Clustering students into groups according to their learning style," *MethodsX*, vol. 6, pp. 2189–2197, 2019, doi: <https://doi.org/10.1016/j.mex.2019.09.026>.
- [28] M. G. Vashisht, Bhawna, and A. Kalra, "Students Expectations using Opinion Mining Clustering," *International Journal of Innovative Technology and Exploring Engineering*, vol. 8, no. 9S, pp. 716–720, 2019.
- [29] G. Mariscal, Ó. Marbán, and C. Fernández, "A survey of data mining and knowledge discovery process models and methodologies," *Knowl Eng Rev*, vol. 25, no. 2, pp. 137–166, 2010, doi: 10.1017/S0269888910000032.
- [30] P. Chapman *et al.*, *CRISP-DM 1.0: Step-by-step data mining guide*. 2000.