Shanney Suhendra

Professor Josephine Wolff

DS 153 - Final Project

15 December 2023

**Introduction**

Application area of machine learning I researched on is the Early Alert Systems (EAS) in Higher Education. It is a system that utilizes predictive analytics to predict students that are at academic risks. With EAS, staff and faculty can intervene to support the students identified. I am directing my recommendations to the US Department of Education (DE). Since different Educational institutions have their own unique development and protocol of the EAS, it is important for the DE to establish a universal foundational framework for all institutions to follow. The following recommendations include:

**Informed Consent**

The first key recommendation involves mandating educational institutions to obtain informed consent from students prior to data collection and utilization for the EAS. Students should receive a comprehensive disclosure detailing all aspects involving their data process, including the types of data to be collected, the purpose of the collection and the intended use of the analysis. Additionally, ethical guidelines may differ among educational institutions based on their respective policies. Nonetheless, the DE should establish fundamental ethical guidelines applicable universally across all educational institutions. Universal guidelines should incorporate the exclusion of unethical methods of obtaining student data, including invasive monitoring methods such as surveillance data or social media presence. The exclusion of these invasive monitoring methods aligns with the principles of privacy, consent, and ethical data usage. It upholds the rights of students to maintain autonomy over their personal lives and ensures that the EAS operates within ethical boundaries.

**Ethical Indicators**

Guidelines should discuss the ethical use of the different types of indicators incorporated into the EAS. This includes social/emotional indicators and student sensitive information such as health-related information, financial details and psychological profiles. The process of "Referrals", a pivotal role in identifying students at academic risk, should also be addressed. Discussions include who are allowed to refer students they think are at academic risks, these include academic staff, resident assistants, parents, and peers. The guidelines must establish clear criteria for the identification of at-risk students and mandate the creation of a structured review committee to assess the validity of referrals. In terms of confidentiality, the institution must ensure the sensitive nature of the referral process is handled discreetly. Overall, these ethical indicators should underscore the utilization of essential academic indicators by default (class attendance, assignment submission patterns, grades, etc), with the understanding that any deviation from this norm, such as social indicators and referrals, requires explicit discussion and approval within individual educational institutions, adhering to established ethics processes. These approaches aim to empower students by offering them informed choices concerning their data, fostering a secure environment for their educational journey.

**Regular Ethical Reviews and Adaptive Oversight Mechanism**

Establish and require educational institutions to conduct regular ethical reviews of their EAS.

*Inclusive Stakeholder Representation*

These review processes should involve a diverse demographic group of stakeholders as this contributes to a more comprehensive evaluation and ensures the evaluation is as unbiased as possible. Primary stakeholders should include those that have a direct impact and continuous involvement with the system; students, academic staff, ethics board and IT committee. Secondary stakeholders may also be considered; community representatives such as diversity inclusion and parents, and external experts in education technology. This group of stakeholders are responsible for the overall oversight of the system. More specifically, the developers and programmers in the IT committee are responsible for programming errors

or malfunctions, and the the ethics board are responsible assessing that the EAS are up to ethical standards. Depending on the severity of concerns that arise from the EAS, the consequence for those involved may entail a change in leadership, ethics investigation and discontinuation of the EAS.

*Adaptive Review*

The framework of the review process should be flexible to allow for quick and responsive changes. Ethical standards evolve regularly and this approach ensures the system continues to be fair and consistent. An example framework is establishing an online forum where stakeholders and the larger educational body can raise emerging concerns related to the system. This forum allows for real-time discussion and quickly mitigates problems. Additionally, including the larger educational body in the review process allows for more diverse viewpoints.

**Personnel Training**

Mandate training for personnel/stakeholders involved in the administration and analysis of EAS. Training should include ethical considerations, privacy protection, legal compliance and sensitive data handling. These training examples highlight the diverse range of topics that should be covered in the training programs, ensuring that personnel are equipped with the knowledge and skills necessary to responsibly administer and analyze the EAS. The DE may also encourage educational institutions to enforce personnels to participate in certified programs related to data. This establishes a recognized standard of competence. Educational institutions should also establish a system for regular evaluations of personnel's understanding and application of ethical principles and privacy protection measures. This ensures ongoing compliance and identifies specific individual areas for additional training.

**Bias Detection and Cultural Sensitivity**

*Demographic Impact Assessment*

To ensure fairness in EAS, it is crucial to regularly enforce demographic impact assessments, conducted by the diversity inclusion board. These assessments involve a systematic evaluation of how

system-generated alerts are distributed across diverse student demographics, including race, ethnicity, gender, and socioeconomic status. The process combines thorough data collection and analysis, incorporating both quantitative measures and qualitative insights from stakeholders like students, educators, and community representatives. By identifying patterns of alert generation, institutions can pinpoint any disparities or biases, providing a comprehensive understanding of the system's impact on different demographic groups. The findings from these assessments inform the development of targeted mitigation strategies, such as algorithm adjustments and enhanced decision-making processes.

*Diversity in System Development*

Encourage institutions to foster diversity within the development teams responsible for creating and maintaining EAS. To achieve this, institutions can implement various strategies such as networking and outreach, and inclusive hiring policies. This reduces unconscious bias: Inclusive teams can help identify and mitigate unconscious biases that may inadvertently be embedded in the system. This is crucial for preventing the perpetuation of stereotypes or discriminatory outcomes in the alerts generated by the system.

**Transparency**

Enforce transparency regarding the algorithms and require concise explanations of how the data is analyzed and reached.

*Mandatory transparency reports*

Report should provide detailed insights into the algorithms utilized in their EAS. The content of these reports should encompass a thorough examination of the algorithms, elucidating key elements such as the data variables or indicators integral to the analysis, how the algorithm assigns weights importance to different variables in order to elucidate the factors that contribute to the algorithm's decision-making hierarchy, and the thresholds used to prompt the system to generate alerts. To maintain an ongoing dialogue and ensure stakeholders remain informed, these reports should be issued regularly (annually or

semesterly) to relevant stakeholders. This ensures stakeholders have access to up-to-date insights into the functioning of the EAS.

*User-friendly Explanations and Plain-Language Communications*

When presenting information regarding the EAS to the public, educational institutions should incorporate a user-friendly approach that is easily understandable by a diverse audience, irrespective of their technical expertise. This includes providing resources that consist of clear technical term definitions and extensive FAQ sections in plain language. The use of informative visual infographics is also encouraged, as this can simplify intricate processes, offering a visual narrative that reinforces key concepts and facilitates a quicker grasp of the EAS's functionality.

These approaches cultivates a shared comprehension of EAS.

*Interactive Platforms*

The DE should promote educational institutions to develop an interactive online platform where students, parents, and educators can simulate and interact with simulated versions of the EAS. This virtual experience allows users to interact with the various features and functionalities of the system, gaining practical insights into how it operates and how alerts are generated. This approach facilitates a more profound understanding of the EAS's purpose, mechanics, and potential benefits. Additionally, this allows users to raise any concerns regarding the EAS and for the EAS team to take necessary actions moving forward. Overall, this experience enhances understanding of the system and cultivates a sense of collaboration.

**Implementation of the EAS, Ethical Interventions and Accessible Support Services**

Institutions must only use the EAS as tools for providing accessible support services to students in need. Unethical practices are strictly prohibited. This includes: encouraging identified individuals to drop out, stigmatizing or discriminating against identified individuals, sharing sensitive student information without consent, or employing the data for purposes unrelated to academic support. Institutions must uphold the ethical standards in the implementation of EAS. Interventions Prioritize must be proactive, supportive,

and designed to enhance the overall well-being of students. Institutions must ensure that support systems, such as tutoring or advising, are in place to follow through with any students identified through the EAS. School must incorporate clearly defined measurable outcomes, ensuring a systematic evaluation of the effectiveness of support mechanisms and continuous improvement in student success.

**Concluding Statement**

These recommendations provide g a holistic regulatory framework for the application of the Early Alert Systems. Recommendations provided addresses crucial aspects such as specifying requirements for datasets used in model development, incorporating transparency, determining the oversight structure for final decisions, assigning responsibilities, assessing biases and implementing ethical use of the EAS. These recommendations guarantee the ethical, accountable, and unbiased deployment of the EAS.

**Sources**


(1) Seltzer, R. (2002, October 19). *"Are early alert systems helping or hurting students at community colleges?"* Higher Ed Drive. https://www.highereddive.com/news/are-early-alert-systems-helping-or-hurting-students-at-community-colleges/634387/

(2) Joseph, Y., McPhate, M. (2016, February 29). "*Mount St. Mary's President Quits After Firings Seen as Retaliatory".* The New York Times. https://www.nytimes.com/2016/03/02/us/simon-newman-resigns-as-president-of-mount-st-marys.html

(3) Hanover Research (2014, November). *"Early Alert Systems in Higher Education"*. https://www.hanoverresearch.com/wp-content/uploads/2017/08/Early-Alert-Systems-in-Higher-Education.pdf

(4) Ekowo M., Palmer, I. (2016, October). *"The Promise and Peril of Predictive Analytics in Higher Education"*. New America. https://files.eric.ed.gov/fulltext/ED570869.pdf

(5) Office of Educational Technology. https://tech.ed.gov/ai/

(6) Bruch, J., Gellar, J., Cattell, L., Hotchkiss, J., Killewald, P. (2020, July). *"Using Data from Schools and Child Welfare Agencies to Predict Near-Term Academic Risks"*. Institute of Education Sciences. https://ies.ed.gov/ncee/edlabs/regions/midatlantic/pdf/REL_2020027.pdf

(7) Yağcı, M. (2022, March 3). *"Educational data mining: prediction of students' academic performance using machine learning algorithms"*. Springer Open. https://slejournal.springeropen.com/articles/10.1186/s40561-022-00192-z