SHORT-PAPER

Re-Instatement of Pell Grants for Incarcerated Students: Implications for CS Education

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Re-Instatement of Pell Grants for Incarcerated Students: Implications for CS Education

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ABSTRACT

The US incarcerates more people, and at a higher rate, than any other country in the world—predominantly low-income people of color. Higher education in prison (HEP) has a powerful impact on justice-impacted people, improving their quality of life during incarceration and reducing their likelihood of returning to prison post-release. HEP nearly disappeared in 1994 after Pell Grant eligibility was eliminated for incarcerated students, which was recently reinstated. More computing educators can reach incarcerated students with digital literacy skills, core computing content, and critical analyses of the impacts of computing on society. CS education researchers can also support the growth of CS education in prisons, and influence policies restricting technology infrastructure.

CCS CONCEPTS

• **Social and professional topics** → **Computing education**; **Adult education**.

KEYWORDS

higher education in prisons; diversity; computing education

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1 INTRODUCTION

Despite an average crime rate [5], the US has the highest incarceration rate in the world [58]. This national crisis, known as mass incarceration, entraps nearly two million people in a cycle of incarceration and exclusion: 87% of people released from prison are re-arrested within nine years, with exclusionary policies from housing to employment leaving few pathways to success [7]. Furthermore, the prison system propagates existing inequality as it "deepens disadvantage and forecloses mobility for the most marginal in society" [56]. People of color are incarcerated at significantly higher rates than white people, and the incarcerated population are poorer, less educated, and more likely to have existing mental and physical health issues than the general population [29, 45, 47, 59]. So-called "color-blind" policies further reinforce these disparities [6].

Fueling the size and ineffectiveness of the US prison system are punitive policies, as opposed to evidence-based rehabilitative measures [4]. This includes longer sentences, and more restrictive technology access in prisons compared to other developed countries [4, 44]. The resulting lack of digital literacy amongst incarcerated people creates greater barriers in finding employment and navigating modern society post-release—especially since the COVID-19 pandemic [12, 48]. This also creates logistical challenges for offering computing and other STEM courses in higher education programs (HEP) programs [19].

Both incarcerated people and the computing field stand to benefit from improving and expanding CS education in prisons. Tools and innovations in computing suffer by excluding the perspective of justice-impacted individuals in industry [35] which could be particularly well-suited for formerly incarcerated individuals who are often excluded by law from more customer-facing professions [13]. Computing tools are at the heart of "data-driven" reforms in the criminal justice system, leading to a "digitized carceral state" [49], exacerbating existing biases and inequities [11]. The de facto exclusion of justice-impacted individuals from these spaces presents a significant conceptual lacuna. As HEP programs expand, CS educators can facilitate this much-needed broadening of participation in computing.

2 POSITIONALITY

All of the authors on this paper support CS education in prisons and believe that it can improve outcomes for justice-impacted individuals. Several of the authors have experience teaching CS in US prisons. One has explored strategies for teaching CS1 in prison to students without a code interpreter. Another taught both an introductory course as well as OOP in a well-established HEP program with relatively more technology infrastructure. One of the authors has worked on informal CS learning in prisons, and creating pathways for transitioning to employment in CS post-release. Other authors on this paper have plans to teach CS through HEP programs, and have participated in research on the subject. One of the authors' research interrogates how computing in the form of "data-driven" decision-making in the criminal justice system encodes ideologies that lead to racialized dehumanization of incarcerated people, and therefore believes that justice-impacted people themselves should have the opportunity to be participants and producers in the field of computing.

Various dimensions of our identities have impacted our involvement in this space. The first author identifies as a white female whose immigrant grandparents had a profound impact on her identity and current work educating older adults in prison, who similarly lack opportunities to pursue academic excellence. The second author identifies as a South Asian woman with no experience of being justice-impacted in the United States herself; her background of having grown up in one of the most militarized regions in the world underpins her understanding of law-enforcement, judicial systems, and incarceration. The third author identifies as a white male who is adopted and a former foster child whose biological mother was justice-involved; he lives in a rural area deeply impacted by the opioid epidemic. The fourth author identifies as a white male who understands the impact of Pell grant support, having been granted one himself as a first-generation college graduate. The fifth author identifies as a South Asian man with no experience of being justice-impacted. The sixth and last authors identify as white males with no experience of being justice-impacted.

3 BACKGROUND AND MOTIVATION

3.1 Why Expand Education in Prisons

Currently, prisons are places of extreme suffering, violence, exploitation, and waste [30, 55, 57]. As Karpowitz writes, "[HEP's] foremost goal must be not to change people in prison, but to change the landscape of the prison itself" [30]. Education in prisons creates an environment where people who are constantly dehumanized can foster dignity and positive self-regard [18, 23]. It not only impacts students as individuals, but reduces violence and promotes more peaceful and just communities within the prison [14, 38, 46].

At the individual level, benefits of participating in education during incarceration include improved mental and physical health, self-worth and motivation, and family relationships [43]. Participating in education, and particularly higher education, is also highly effective in reducing recidivism (likelihood of returning to prison post-release) for the 95% of incarcerated people who are eventually released [28, 40]. Consequently, prison education programs are highly cost-effective: a 2013 meta-analysis by Davis et al. found that every dollar invested in prison education returns $4-5 in savings by preventing students' re-incarceration [21].

3.2 Why Now: Renewed Pell Eligibility

HEP has been around since the early nineteenth century, gaining momentum in the 1960's and continuing to grow until a sudden halt in 1994 [20]. This was a result of President Clinton's 1994 crime bill (also featuring the more well-known "three-strikes" law), which eliminated Pell Grant eligibility for incarcerated students [42]. The impact was swift and dramatic: there were 350 HEP programs in the country in 1982, which had doubled to 772 by the early 1990s. By 1997, only eight remained in operation [50]. Despite the overwhelming bipartisan popularity of tough-on-crime political rhetoric and policies, this strategy has never been effective or grounded in facts [42]. The prison population has grown by over 500% in the last forty years to nearly two million people [39], resulting in federal spending on corrections increasing at three times the rate of that on Pre-K-12 public education [3].

Reinstating Pell eligibility to incarcerated students has been a bipartisan process, spanning the Obama, Trump, and Biden presidencies [37, 50]. The policy reversing the 1994 decision was signed in 2019, and set to take full effect in July 2023. Yet, recent work documents the persisting funding challenges for HEP programs, as well as underlying inequities in the current implementation of the new Pell Grant policy [15]. An estimated 463,000 incarcerated students are newly eligible for federal funding to pursue HEP [40]; however, far from this number of incarcerated students actually enrolled this year. Recent reports show 396 HEP programs (104 offering Associate's Degrees and 38 offering Bachelor's Degrees) enrolling a total of 58,494 students [24]. Gender, racial, and economic inequities in HEP also persist: for example, Black and Hispanic students have significantly lower completion rates than their white counterparts [41]. Castro et al. conclude that while "Pell restoration could be an effective lever for advancing racial and economic justice," universities, departments of corrections, and policymakers must work together to prioritize equity [15].

3.3 CS/STEM are Undertaught in HEP

HEP programs struggle to offer a diversity of programs—particular "hard sciences" including computing [19]. Logistical and systemic barriers make STEM programs particularly difficult, such as a lack of laboratory infrastructure [19]. As stated in a 2022 brief by the US Department of Education on the need for increased technology infrastructure for prison education, how technology is integrated in prisons "is typically driven by security requirements, rather than instructional needs" [27]. In the minority of HEP programs that have internet access, it is limited to a learning management system (LMS) and/or an online research database (which itself is often limited) [52]. Access to critical technical tools for CS education, such as code interpreters enabling students to run their own code, have seemingly stalled, if not regressed, since the pre-1994 era of HEP [8, 26]. Select examples of technical training programs like coding bootcamps have successfully partnered with prisons to create the technical infrastructure to support their programs [1, 9], but this is less feasible for HEP programs, and especially newer programs without years of trust built up in the prison-university partnership.

In addition, vocational training programs are likely not eligible to be covered by Pell Grants, which makes CS pathways through traditional higher education particularly primed for expansion in this moment.

4 LANDSCAPE OF CS EDUCATION IN PRISON

4.1 Computing in HEP

Following a similar timeline to Pell eligibility for incarcerated students, one early work related to computing in HEP appeared in the 1990 SIGCSE Technical Symposium [8] and only very recently has additional work been published on the subject [26].

Pre-dating the 1994 HEP crisis, Aman's experience report details a complete CS Bachelor's degree offered in prison [8]. In a well-established HEP program active from 1968 through the mid-90s, 20% of the incarcerated students majored or minored in CS. Two full-time CS faculty along with 4-5 adjunct professors provided the full array of CS courses, and students in the prison were held to the same curriculum and GPA requirements as those on campus. Aman noted two primary disadvantages incarcerated students experienced compared to those on campus: limited access to a prison computer lab (a few hours weekly compared to unlimited access on main campus), and insufficient prerequisite preparation, specifically in mathematics courses not offered in the prison. He also writes about unique advantages of teaching CS in the prison context, such as the increased depth of student questions in lecture [8].

Over thirty years later, Hogan et al. built on this work in another experience report of teaching CS1 in a HEP program [26]. They note the troubling observation that some of the same issues faced by Aman's students still existed, some worse. For example, a significant portion of this work focused on strategies for adapting the course to students having no access to a code interpreter. Takeaways from this work include the criticality of collaboration policies that allow for students to use each other as a resource, strategies for simulating the debugging process without interpreters, and positive student reactions to peer instruction.

4.2 Vocational and Informal CS in Prison

In a 2023 study, Díaz-León et al. designed and executed an introductory informatics program with 25 incarcerated men in a Peruvian prison [22]. The study showed that CS Unplugged [10] resulted in significantly increased positive perceptions towards computing and informatics, and that the incarcerated students were able to successfully complete most of the assignments. Since CS Unplugged had previously been mostly limited to K-12 settings, this study offered promise that it could translate successfully to prison environments where technology is limited or completely restricted [22].

Other initiatives in facilities with more technical infrastructure (often funded by the program, not the prison) have made great strides in vocational CS training (such as coding bootcamps) and informal CS learning. Unlocked Labs is one such program, a technology startup co-founded by a formerly incarcerated woman who taught herself to code while in prison [9]. Unlocked Labs hires currently[1] and formerly incarcerated people to work on their product, an LMS designed specifically for prison contexts [9]. Another nonprofit organization, The Last Mile, offers a coding bootcamp program in multiple facilities, and assists participants in transitioning to careers in the technology industry post-release [1]. NSF-funded work by Cencini et al. established communities of informal CS learning in and outside of prisons, focusing on the bridge from incarceration into work in technology, entrepreneurship, and continued education post-release [16].

5 CALL TO ACTION: POLICY AND RESEARCH

5.1 CS Faculty Recruitment in HEP

Prior work from Aman has shown that a full computing degree program can be both successful and popular amongst incarcerated college students [8]. As this program and many others have since been lost, new work is needed to rebuild the presence of CS and STEM in HEP programs in the US.

In our experience, a significant barrier to increasing CS offerings in HEP programs is recruiting CS faculty. Hiring faculty (and K-12 teachers) is a challenge across CS education, and hiring for prisons—often geographically far from city centers—may be an even greater challenge. Although CS faculty, instruction, and curriculum ideally would be identical in HEP and traditional college programs, graduate students might be able to help either with prison instruction or by covering for faculty at their home institution. Another solution might be to offer a class in-person at a prison and use the recordings for a remote section of a class at the home institution, where remote offerings are increasing already.

However, we believe creating sustainable and equitable CS higher education pathways in prisons will require outside funding support in addition to Pell. Many CS departments are currently strained with high-enrollment on main campus, creating more pushback to additional course offerings in prisons. While HEP programs can often cover some cost to departments for hiring a replacement lecturer on main campus, CS lecturers tend to have a budgetary cost that exceeds what typical HEP reimbursement has traditionally provided to departments with less capacity pressure. Funding bodies, such as NSF and private foundations, could supplement these costs to allow in-demand majors like CS to be included in HEP programs.

Given the ongoing difficulty of finding experienced CS instructors, we believe more research is needed to better understand the perspectives of CS faculty about teaching in prison, what incentives may be needed, and what institutional barriers might dissuade or prevent faculty from participating.

5.2 Increase Technology Access in Prisons

Security and safety concerns drive the administrative blockage of incarcerated students' access to more adequate technology [27]. Although CS HEP programs can be successful in this context (see Section 4), we believe that these policies have negatively impacted CS in HEP, deterring computing educators from trying to teach until more technology infrastructure is in place. However, we argue that this order could be reversed: in order to impact policies blocking

[1] In the particularly progressive Maine prison system, some prisons allow significantly more access to technology and the internet. Thus, some currently incarcerated people are able to work remotely for the technology company as software engineers.

access to technologies critical for computing education in prisons, we first build an evidence-based case for computing (and more generally, STEM) education in HEP.

The introduction of greater computing resources (e.g., computers, networking, internet access) for computer science education's sake would also benefit other STEM fields. Biology, chemistry, and physics education that rely on laboratory experiences are difficult to deliver in a prison environment, but the use of computer simulation could be used as a substitute for some of these laboratory exercises.

5.3 Opportunities for CS Education Research

5.3.1 Lack of Technology Infrastructure. The majority of prisons in the US and globally lack basic technology infrastructures [27]. Even in prisons where students have access to computers, their access is subject to more frequent interruptions (e.g., security issues on the yard causing shutdowns restricting their movement) and may be limited to certain hours. Specific to CS, prisons may be reluctant to install [26]additional software (e.g., code interpreters). In addition, regulations around student electronic communication complicate group work, especially in the CS classroom where we often expect students to collaborate using tools like Slack and Git. Technical affordances in prisons can be anywhere between those hosting coding bootcamps and those where students have no access to technology whatsoever (as was the case for Díaz-León et al.'s work with CS Unplugged [22]). It is worth noting that these technical limitations are not only true of prison environments, but of many under-resourced communities in the world where it would be valuable to bring CS education. Therefore, innovations in CS education to adapt to prison environments with limited infrastructure could have benefits beyond the scope of HEP.

5.3.2 Few Avenues for Additional Help. Traditional CS students are able to access web resources (e.g., YouTube, Stack Overflow), allowing them to develop the skill of effectively evaluating information sources [31]. In addition, they generally have more access to instructional staff and peers. Although the amount and breadth of materials accessible to incarcerated students varies by facility, these usually consist of educational materials pre-downloaded by the mostly for-profit companies supplying prison tablets and laptops [52]. More specifically, Tanaka and Cooper found that these resources "tend to be freely available resources of uncertain quality or utility to keep costs low" [52]. For HEP students, this can mean total dependence on the instructor to provide additional resources when necessary, which can become infeasible. Given the "off-site" nature of many of these classrooms, having teaching assistants and tutors that can aid in face-to-face educational experiences is critical. Training students (incarcerated or otherwise) to help fellow students is a learning opportunity for all those involved. However, thorough education and training is necessary.

5.3.3 Teaching CS to Older Adults. The typical age of incarcerated students and length of time incarcerated prior to beginning HEP vary widely by program. Nonetheless, compared to traditional CS college students, incarcerated college students are inevitably less acquainted with modern technology. As an extreme example, several authors on this paper have worked with incarcerated students who had never interacted with a computer prior to the HEP program. In addition, adults have different learning needs than children and young adults [17]. No prior work, to our knowledge, has documented the specific struggles of incarcerated older adults in learning CS. More CS education research devoted to the subject, along with a resulting coordinated intervention, could have an impact for incarcerated adults in and outside of learning CS.

5.3.4 Racially and Economically Diverse Students. In their work on racial inequity in HEP, Taylor et al. advocate for the use of more inclusive teaching practices such as Culturally Relevant Pedagogy [33, 53]. A growing body of research in CS education is embracing these inclusive frameworks, with positive results for students from racially diverse backgrounds [34]. As prison classrooms are more diverse than traditional campuses in terms of racial and economic backgrounds, future work could build on these existing frameworks to fully utilize the unique assets incarcerated students bring to the classroom, and potentially the future of computing.

5.3.5 Greater Presence of Learning Disabilities. The documented over-representation of learning disabilities (LDs) in prisons is a multi-dimensional problem. Students with LDs are more likely to struggle and drop out of school, which puts them at higher risk for incarceration [36]. In addition, students of color with LDs are less likely to receive the resources they need [36]. Once inside prison, despite policies in place to ensure young adults with LDs have access to educational resources, adults with diagnosed LDs may have difficulty accessing resources in prison [54]. Furthermore, Koo documented the immense barriers for incarcerated individuals with undiagnosed LDs to be evaluated and formally diagnosed [32]. Growing work in CS education has focused on students with LDs [25], providing a basis for future work to support incarcerated CS students with LDs—both diagnosed and undiagnosed. Furthermore, this work could improve outcomes for students with LDs outside of prison as well.

5.3.6 Gender Inequity in Prison Education. Women are the fastest growing group of incarcerated people in the US [51]. Education programs in women's prisons tend to focus on traditional gender roles (e.g., cosmetology) and have fewer formal higher education programs compared to male prisons [43]. Motivations for participating in prison education programs also differ by gender: connecting with family is a main motivation for incarcerated women pursuing education as opposed to furthering job prospects post-release [43]. Furthermore, as formal educational programs and the technical infrastructure to support them have historically been focused towards male facilities, inequities in resources available for educational programs remain today in women's facilities.

6 IMPLICATIONS

Higher education in prisons is at a pivotal moment for rebuilding, with the re-instatement of Pell Grant eligibility for incarcerated people after nearly three decades. It is crucial for CS educators to partake in the re-imagining of HEP to incorporate more CS and STEM opportunities [2]. Efforts to influence policy as outlined in this paper, including those to increase recruitment of CS faculty

to teach in prisons and support the expansion of technical infrastructure to do so, could help create a new synergistic relationship between HEP and STEM diversification. The ultimate goals of doing so would be to harness the power of higher education to make prison environments more peaceful and just [38], and in the words of Karpowitz, "create structures at once inclusive and excellent that diversify rather than narrow the subjects of study and the roads of future intellectual and professional life" for incarcerated individuals [30].

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