Building Accommodations on UC Berkeley Campus

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Motivation of the Project

I started this project to explore the current status of physical accommodations for students with disabilities on campus. As a student with disability myself, I often feel like my community is ignored and the support is either inadequate or hard to get. With a data analysis project specific on one aspect of the accommodations, I hope to shed light on how the school is helping disabled community, and whether there are better ways to support it. Specifically, I would like to explore data regarding accommodation equipment for each classroom and building, as well as their status (functional or broken). My goal is to (1) have a review over one of the ways the school is doing for its commitment to diversity, including the commitment to accommodating students with disabilities; (2) provide recommendations on how the campus could improve its physical accommodations for students.

Dataset Description

One of the major data sources of my project is the Classroom Database, created by the Berkeley Educational Technology Services (ETS), who is under the Berkeley Research, Teaching, and Learning (RTL). It is collected from classrooms across the UC Berkeley campus. The specific collection process of this dataset is not specified on the website, but further conversations with the ETS and RTL staff could reveal the process. Currently, my assumption is that they went to each classroom on campus and recorded their features accordingly. The database is stored on the ETS website, and thus should belong to the ETS unit. Given this is a public webpage accessible to public (without CalNet authentication), the licensing should allow for any potential analysis within the scope of my project. Further conversation with Sam Teplitzky has also confirmed that the use of this dataset does not involve any licensing, as the data is a representation of facts. The potential

output of analysis on this dataset would involve cross-examination with other datasets. For example, I could use to this dataset to find out which building has the lowest number of classrooms with course-capture capacity, and then compare with another dataset which has the usage of classrooms by classes from different departments, to examine which department has the most classes without being able to course-capture. As this dataset does not include any private information, there is no need to anonymize or censor the data. Also since the dataset is a representation of factual features of all classrooms, it is very hard to say that could be any bias issue.

Methodology Description

Currently, my datasets are: Classroom Dataset from Educational Technology Services, and "Our Berkeley" from Office of Planning and Analysis. Classroom Dataset contains all the features each classroom has on campus. It should be noticed that the dataset only contains classrooms that are designed for instructional purposes. Therefore, it does not include any meeting or conference room, or any labs. "Our Berkeley" has various information on aggregated students' demographics, including race, gender, and majors. Given these datasets, I do not foresee any needs at the moment to collect first-hand data. For processing these data, I would manually create a spreadsheet that contains the same information from the Classroom Dataset website, so that it could be used in further data analysis in a Jupyter notebook. "Our Berkeley" has a download function for its data representation, so ideally, I would directly download the data I need. After processing all necessary datasets, I would try to analyze if there is an unequal level of accommodations across majors, by looking into the classrooms that different majors have their most classes at. I intend to create a scoring system to evaluate each classroom based on their features of accommodations. Then, I

would utilize the Berkeley Academic Guide website to match each major with classrooms where they hold the most classes. After the matching, I could then average the scores for classrooms within each major to evaluate the level of accommodations for different majors. As a result, I hope to find out if there is any unequal distribution of accommodations across majors, based on their respective classrooms.

All the codes and textual analysis would be stored in a public GitHub repository. The intention of this research is to investigate the disability accommodations on the UC Berkeley campus from a more specific angle. While the school is in compliance with the Americans with Disabilities Act, there could still be students, staff, and faculty who are at disadvantage because of their specific study and work locations. Through a cross-examination between classroom features and demographics in college majors, I hope to provide valuable insight into the policy-making process of providing accommodations on campus. Admittedly, given the large number of classes Berkeley holds each year and its long and changing history, it would be hard for me to capture all the details about classrooms and majors with perfect accuracy, but I hope the research itself could still provide some insight given the recent data that are easy-to-find online.

Analysis - Layout of Campus

For students with disabilities, or DSP students, one common challenge they have is the physical difficulty to travel around campus. The layout and concentration of classrooms on campus thus, could become a factor for DSP students to consider when registering for courses, as most would prefer a shorter travel distance between classes, especially when the travel needs to happen during the 10-minute Berkeley Time.

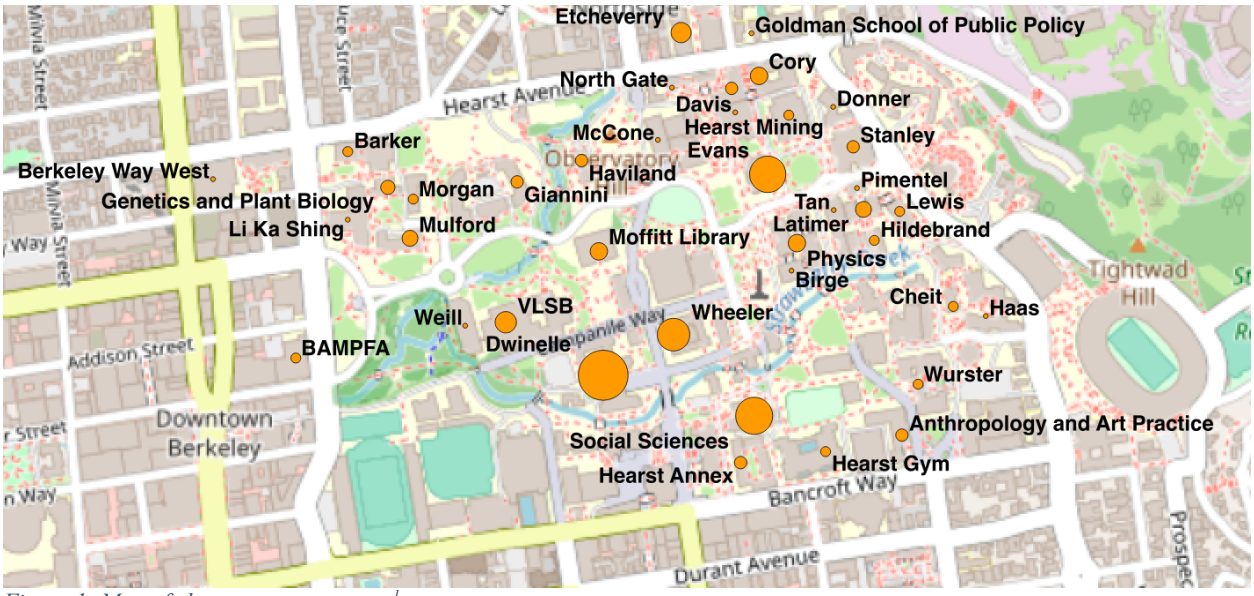

Figure 1: Map of classrooms on campus[1]

The map above shows that most classrooms are concentrated around the central-south area, with Dwinelle Hall, Wheeler Hall, and the Social Sciences Building offering over 60 classrooms. Another center of classrooms is Evans Hall, located in the northern part of the campus. For students whose most classes are in the south, this layout is of little concern. However, students especially those with physical disabilities could worry about this current campus setting, particularly due to its landscape: Evans Hall and many other buildings in the north are located higher than those in the south, as the campus sits on the Berkeley hill. As Berkeley does not restrain classes of one department to be in the same building, students often find their major requirement classes to be scattered around campus, not to mention classes that many take from various departments to fulfill the breadth requirement. It is very likely for students then, to move back and forth between the lower southern part and the higher northern part of the campus every day. For many students this would not become an issue, as the 10 minutes Berkeley time is often enough to make such travel.

[1] The source of data is the Classroom Database organized by the Berkeley Educational Technology Services. Because the dataset only collects information about officially designated classrooms, laboratories and office rooms are excluded. This exclusion for example leaves out almost all the rooms in Soda Hall and Chou Hall.

Yet for DSP students, such climbing and descending could be hard to do in 10 minutes when they need to carry their full backpack with laptops and textbooks. Furthermore, when students use almost the full 10 minutes to reach their classroom, there is little to no time for them find seats and prepare mentally for the next class, while the professor has started the lecture. For lectures that are held in larger classrooms, a late student could find it very hard to find a seat and move to it by bypassing a dozen seated students, forcing them often make the decision to sit in the very back of the room, a position with the least interaction with the instructor to conduct active learning. On a brighter note, campus services such as The Loop do help address the travel difficulty for students with disabilities, but their availability is limited. In the future, it could be worthwhile to consider travel distances as a factor during the class-scheduling process, as nobody probably would enjoy running from Hearst Annex to Etcheverry hall in 10 minutes, only to find the classroom is full.

Analysis – Course Capture by Building

One of the most significant change the campus experienced in recent years was the shift to remote learning during the COVID-19 pandemic starting in March 2020. Since then, UC Berkeley has been maintaining a significant portion of undergraduate classes through either direct remote instruction, or in-person instructions with course capture. Course capture is a technology that would record the lecture in real time with sound and any slideshows by the instructors. These captures would be automatically uploaded to BCourses, an education platform by Canvas that students could watch the lectures after for unlimited number of times, with accommodation features such as closed captions and speed change. Course capture has been used before the pandemic for many classes, predominately in subjects such as computer science who has large classes sometimes over 1000 students in one semester. Those extra-large classes often need course

capture because there is no room available on campus to hold all students in one room, perhaps except the Zellerbach Auditorium which is not a classroom. Thus, many students in those classes have to watch course captures as the major, if not only way for studying the lectures. Below is an aggregated version of part of the classroom dataset which includes the names of campus buildings, the number of classrooms they have, and the number of classrooms with course capture ability.

Building	Course Capture	Total Rooms	%
Dwinelle	40.0	48	0.833333
Social Sciences	12.0	27	0.444444
Wheeler	11.0	21	0.523810
Etcheverry	6.0	8	0.750000
Physics	4.0	6	0.666667
Cory	4.0	6	0.666667
Hearst Annex	3.0	3	1.000000
VLSB	3.0	9	0.333333
Evans	2.0	24	0.083333
Stanley	2.0	3	0.666667
Mulford	2.0	5	0.400000
Morgan	2.0	2	1.000000
Haviland	2.0	3	0.666667
Anthropology and Art Practice	2.0	3	0.666667
Barker	2.0	2	1.000000

Table 1: Dataset of Course Capture Capability by Building

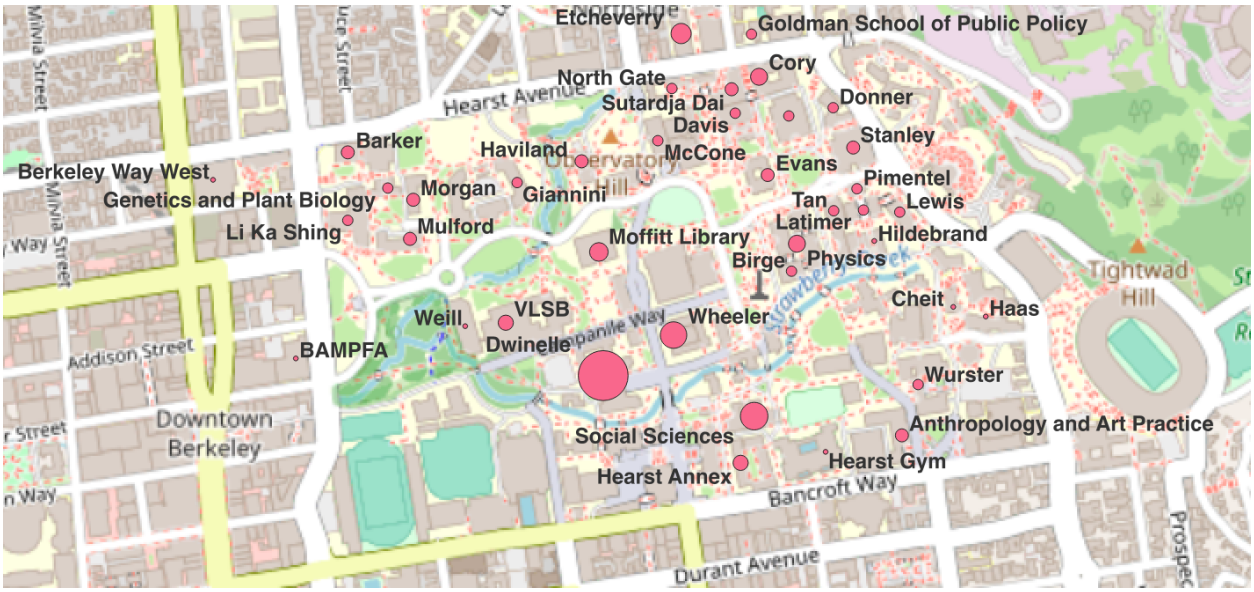

Figure 2: Map of Campus Buildings by Number of Course Capture Classrooms

Based on the dataset, several buildings with multiple classrooms lack enough course capture rooms (CCC, as in Course Capture Classrooms). One particular concern is the Evans Hall, with 24 classrooms but only 2 as CCC. Currently, Evans is the building that houses the departments of Statistics, Mathematics and Economics, all of which are top-10 popular majors on campus. The lack of CCC in Evans Hall therefore produces a potential challenge for students who want to major in those popular STEM subjects but may need course capture to review and enhance their learning experience. This is especially true for the DSP students, who often have difficulties either travel to classrooms or follow the fast-paced lectures. Without enough CCC, it could negatively impact DSP students' willingness and ability to major in those STEM subjects, leading to an imbalance of equity. On a brighter note, as Evans Hall is due to be demolished very soon according to the campus administration, its lack of CCC would no longer be a long-lasting problem.[2]

In addition to examine CCC by buildings, looking at the number of seats in CCC also help us get a better picture of the actual campus capacity to hold classes that could both foster in-person interactions and remote learning.

[2] Aditya Katewa, "'Tends to Stick out': Evans Hall to Be Demolished, Replaced," The Daily Californian (The Daily Californian, February 7, 2022), https://www.dailycal.org/2022/02/06/tends-to-stick-out-evans-hall-to-be-demolished-replaced/.

Building	Latitude	Longitude	No	Yes	cc_ratio
Dwinelle	37.870700	-122.260720	240.0	1860.0	0.885714
Wheeler	37.871290	-122.259420	317.0	1276.0	0.801004
VLSB	37.871470	-122.262520	180.0	723.0	0.800664
Physics	37.872620	-122.257140	123.0	618.0	0.834008
Social Sciences	37.870110	-122.257930	431.0	581.0	0.574111
Pimentel	37.873420	-122.256030	0.0	527.0	1.000000
Stanley	37.874020	-122.256100	35.0	406.0	0.920635
Moffitt Library	37.872500	122.260800	49.0	354.0	0.878412
Evans	37.873620	-122.257680	592.0	339.0	0.364125
Etcheverry	37.875680	-122.259280	72.0	330.0	0.820896
Hearst Annex	37.869430	-122.258180	0.0	309.0	1.000000
Li Ka Shing	37.872960	-122.265440	0.0	297.0	1.000000
Cory	37.875050	-122.257840	51.0	289.0	0.850000
Lewis	37.873080	-122.255240	72.0	261.0	0.783784
Genetics and Plant Biology	37.873430	-122.264700	110.0	204.0	0.649682
Anthropology and Art Practice	37.869830	-122.255200	25.0	199.0	0.888393
Sutardja Dai	37.874869	-122.258347	30.0	198.0	0.868421
Mulford	37.872690	-122.264290	61.0	191.0	0.757937
Morgan	37.873260	-122.264230	0.0	182.0	1.000000
Latimer	37.873110	-122.255910	114.0	179.0	0.610922
Hearst Mining	37.874480	-122.257290	48.0	160.0	0.769231
Birge	37.872220	-122.257240	0.0	159.0	1.000000
Barker	37.873950	-122.265440	0.0	140.0	1.000000
North Gate	37.874880	-122.259450	0.0	139.0	1.000000
McCone	37.874120	-122.259710	0.0	100.0	1.000000
Donner	37.874600	-122.256470	0.0	87.0	1.000000
Haviland	37.873820	-122.261120	18.0	87.0	0.828571
Goldman School of Public Policy	37.875670	-122.257980	0.0	86.0	1.000000
Tan	37.873100	-122.256460	0.0	76.0	1.000000
Davis	37.874520	-122.258280	0.0	62.0	1.000000
Wurster	37.870570	-122.254900	48.0	61.0	0.559633
Giannini	37.873510	-122.262310	40.0	50.0	0.555556
BAMPFA	37.870950	-122.266400	265.0	0.0	0.000000
Bechtel	37.806480	-122.263630	227.0	0.0	0.000000
Berkeley Way West	37.873550	-122.267930	75.0	0.0	0.000000
Cheit	37.871700	-122.254250	75.0	0.0	0.000000
Haas	37.871560	-122.253650	299.0	0.0	0.000000
Hearst Gym	37.869590	-122.256610	58.0	0.0	0.000000
Hildebrand	37.872660	-122.255710	70.0	0.0	0.000000
Weill	37.871420	-122.263270	91.0	0.0	0.000000

Table 2: Dataset of Course Capture Capability by Seats in Buildings

From the above dataset, it can be seen that only few buildings have less than 50% of its seats in the non-CCC, and only Evans, Bechtel, and Haas (Faculty Wing) of those have more than 100 seats.[3]

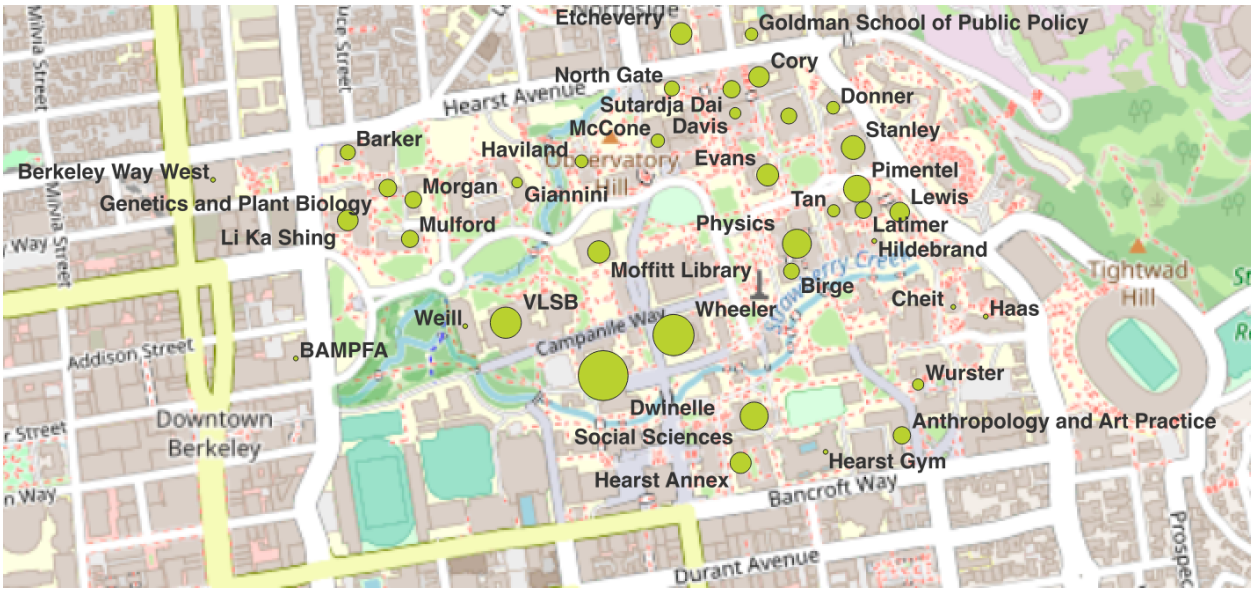

Figure 3: Map of Course Capture Capability by Seats in Buildings

[3] BAMPFA, or Berkeley Art Museum and Pacific Film Archive is not mentioned because it is not a lecture building.

Analysis – Course Capture by Department

While the previous sections have provided insight on the performance of campus buildings with regards to providing course capture classrooms, most students cannot choose their ideal building or classroom when registering for classes. They can, however, select their preferred classes, most often from departments that they major in. Therefore, looking at how well does each academic department provide accommodations becomes an even more valuable approach. Specifically, I used the Classroom Database to join with the archived class schedule report from Fall 2016 to create a combined dataset which has information on each class, their assigned classroom, and the condition of that classroom.

Building	Classroom Number	Seats	Active Learning	Movable Chair	Whiteboard	Course Capture	Camera with Operator	Camera without Operator	Subject
Anthropology and Art Practice	115	25	0.0	1.0	1.0	0.0	0.0	0.0	AMERSTD
Anthropology and Art Practice	115	25	0.0	1.0	1.0	0.0	0.0	0.0	ANTHRO
Anthropology and Art Practice	115	25	0.0	1.0	1.0	0.0	0.0	0.0	COLWRIT
Anthropology and Art Practice	115	25	0.0	1.0	1.0	0.0	0.0	0.0	COLWRIT
Anthropology and Art Practice	115	25	0.0	1.0	1.0	0.0	0.0	0.0	ENGIN
...	...	...	...	...	...	...	...	...	...
Moffitt Library	150D	49	0.0	1.0	1.0	0.0	0.0	0.0	PHILOS
Moffitt Library	150D	49	0.0	1.0	1.0	0.0	0.0	0.0	PHILOS
Moffitt Library	150D	49	0.0	1.0	1.0	0.0	0.0	0.0	PLANTBI
Moffitt Library	150D	49	0.0	1.0	1.0	0.0	0.0	0.0	PLANTBI
Moffitt Library	150D	49	0.0	1.0	1.0	0.0	0.0	0.0	SPANISH

Table 3: combined dataset with information on each class as well as their classrooms

It needs to be mentioned that there are some limitations to this dataset. While the Class Schedule team publishes a full list of classes every semester online through the Berkeley Academic Guide website, the latest version that has a cleaned format to be used in data analysis is from Fall 2016. This timeliness issue produces several specific limitations: (1) newer campus buildings such as Chou Hall was not yet in use back in 2016, and (2) Some majors like Data Science were not established at that time. However, just by analyzing this dataset which already has an abundance

of information for most classes and majors that are still active today proves to be useful and deserves further discussions.

In order to measure departments' performance on accommodations and compare them together, a quantitative metrics is needed. I created two scoring mechanisms to examine departments, one by looking at classrooms and the other by seats. The first one is achieved through the following steps: first grouping the combined dataset by the department ("Subject") to examine how classes in each department are scheduled in which classrooms. Then I aggregated the result t o check how many classes in each department are scheduled in CCC and those that are not. Finally, I calculated the percentage of CCC usage in each department as a score to evaluate the accommodation level each department has.

Subject	%
PSYCH	1.000000
ELENG	0.872340
CHEM	0.727273
INTEGBI	0.700000
UGBA	0.642857
ENGLISH	0.619048
CHMENG	0.615385
MEDIAST	0.590909
LINGUIS	0.583333
MCELLBI	0.538462
COMPSCI	0.537500
COGSCI	0.500000
SOCIOL	0.493333
ECON	0.479675
HISTORY	0.476190
STAT	0.431818
POLSCI	0.425532
PBHLTH	0.387755
ESPM	0.344828
MATH	0.312057

Table 4: CCC Score by Department

On the left is the resulting dataset which includes the most popular majors on campus.[4] The "%" column represents the percentage of CCC used in each department's scheduled classes in the semester of Fall 2016. The Department of Psychology stands out as the only department in this list to achieve a 100% usage rate of CCC, meaning all of its courses are available for course capture. Departments of Sociology, Economics, History, Statistics, Political Science, Public Health, Environmental Science, Policy and Management (ESPM), and Mathematics, on the other hand, performed below

[4] The list of most popular majors is taken from the Our Berkeley website, created by the Office of Planning and Analysis. EECS is excluded because of the lack of information on Soda Hall and enough class data.

50% as more than half of its classes are not available for course capture. The average score across all departments is around 61.25%, and only 7 of 22 popular departments in this dataset exceeds this standard, with English being the only non-STEM or business department.[5]

Subject	No	Yes	cc_ratio
PSYCH	0.0	3934.0	1.000000
CHEM	306.0	10143.0	0.970715
INTEGBI	466.0	4242.0	0.901020
UGBA	288.0	2478.0	0.895879
ELENG	425.0	2156.0	0.835335
SOCIOL	897.0	4421.0	0.831328
STAT	762.0	3470.0	0.819943
MCELLBI	1879.0	7692.0	0.803678
CHMENG	627.0	2176.0	0.776311
LINGUIS	444.0	1512.0	0.773006
COMPSCI	2641.0	8717.0	0.767477
COGSCI	249.0	820.0	0.767072
PBHLTH	937.0	2413.0	0.720299
HISTORY	1480.0	3477.0	0.701432
ECON	2365.0	5428.0	0.696523
ENGLISH	1133.0	2373.0	0.676840
MEDIAST	259.0	519.0	0.667095
ESPM	1682.0	3026.0	0.642736
MATH	5877.0	9171.0	0.609450
POLSCI	2147.0	3223.0	0.600186

Table 5: CC Seats Score by Department

The other approach to understand how different departments perform in providing course capture capable classes is to look at how many students they can actually afford in CCC. Below is another dataset that aggregates through seats instead of classrooms to visualize how many students can each department have in CCC.

As it is cost-efficient to have course capture technology in larger classrooms, it is no surprise that all the popular departments in the dataset have more seats in CCC than seats in non-CC rooms. The average percentage, or the "cc_ratio" column in the table is around 71.14%, and 7 departments fail to meet this standard. Among those departments, History, Economics, ESPM, Political Science and Mathematics have below-average scores both when being measured by classrooms or seats. I will explore the reasons for such poor performance in the following paragraph.

[5] Students graduate with a degree in UGBA, or Business Administration get a Bachelor of Science. However, the major itself at UC Berkeley is not classified as a STEM major.

Building	Course Capture	Classrooms Used
Anthropology and Art Practice	0.0	2
Barker	1.0	4
Cory	0.0	23
Cory	1.0	8
Dwinelle	0.0	4
Dwinelle	1.0	43
Etcheverry	0.0	8
Etcheverry	1.0	6
Evans	0.0	102
Evans	1.0	1
Haviland	1.0	4
Hearst Gym	0.0	2
Hearst Mining	0.0	5
Latimer	0.0	28
Lewis	1.0	1
Physics	0.0	6
Social Sciences	0.0	9
Social Sciences	1.0	13
Stanley	0.0	1
Stanley	1.0	1
Sutardja Dai	0.0	4
Sutardja Dai	1.0	1
VLSB	1.0	6

Table 6: Classrooms Usage by Building in Math Department

As shown earlier about the percentage of CCC in each campus building, Evans Hall is one of the worst buildings that provide a significant amount of classrooms with few of them capable to conduct course capture. Combined with its windowless classrooms and aesthetically unpleasing outfit, Evans Hall is also one of most hated building on campus, as phrased by newspapers such as the Daily Californian and SF Gate.[6] The Department of Mathematics, unfortunately, bases inside the building, and operates many lectures and discussions at Evans Hall. As Table 6 shows, Evans hosted more than 36% of all math classes in Fall 2016, but only one class was scheduled in a CCC. The heavy reliance of the Math department on Evans Hall made its classes largely unbale to accommodate remote learning as well as for students who wish to review the contents by rewatching the lectures. Again, with the expected demolishing of Evans Hall in 2023 and the addition of The Gateway building to campus in the near future, departments like Mathematics should be able to provide more diversity in learning mechanisms for their students.

[6] Katie Dowd, "One of UC Berkeley's Most-Hated Buildings Will Be Demolished," SFGATE (SFGATE, February 13, 2022), https://www.sfgate.com/bayarea/article/cal-evans-hall-to-be-demolished-16914778.php. And Pooja Bale, "From the Depths of R/Berkeley: Why Everyone Hates Evans Hall," The Daily Californian (The Daily Californian, February 15, 2019), https://www.dailycal.org/2019/02/14/from-the-depths-of-rberkeley-why-everyone-hates-evans-hall/.

The Charles and Louise Travers Department of Political Science (abbr. Department of Political Science) is a different case than Mathematics: not only does it not depend on Evans Hall as its main instructional building, but it is also a non-STEM major. Having its hub at the Social Science Building (formerly Barrows Hall), the Political Science department enjoys a building with the largest number of Active Learning Classrooms (ALC) that include technology that enables course capture and many more instructor-student interactions.[7] However, only 8 out of 56 political science classes in Social Science Building are scheduled in ALC. Aside from scheduling, the willingness of instructors to use course capture and other modern teaching technology is also worth considering. Many professors at Berkeley have taught classes here before course capture becomes a popular tool, and almost no department, except ones like EECS that requires it to maintain large classes, uses course capture as often as they have to during the pandemic. Therefore, professors without prior knowledge of course capture technology need to learn how to use it, but the details required to set up a functional course capture lecture could be overwhelming, especially for the more senior professors. In the case of Political Science and many other humanities and social sciences, classes were used to be held only by in-person instruction, and face-to-face engagement between instructors and students was vital for successful learning. As the school moved into

Building	Course Capture	Classrooms Used
Birge	1.0	4
Cory	1.0	1
Dwinelle	1.0	6
Etcheverry	0.0	2
Etcheverry	1.0	3
Evans	0.0	1
Genetics and Plant Biology	0.0	2
Hearst Gym	0.0	3
Lewis	0.0	2
Li Ka Shing	1.0	1
Moffitt Library	1.0	2
Mulford	0.0	5
Mulford	1.0	1
Physics	0.0	2
Social Sciences	0.0	37
Social Sciences	1.0	19
VLSB	1.0	3

Table 7: Classrooms Usage by Building in Political Science Department

[7] "Active Learning Classrooms," Active Learning Classrooms | Center for Teaching & Learning, https://teaching.berkeley.edu/resources/course-design-guide/active-learning/active-learning-classrooms.

remote learning during the pandemic, nontraditional ways of instructions such as Zoom classes and course captures became increasingly important, if not already necessary. Instructors who were used to the old way of pedagogy now have to not only learn about these new technologies, but also redesign their classes to accommodate the hybrid or virtual mode of instructions. The time and energy spent on learning these new tools could sometimes be too much for instructors that they would rather prefer to not use it. On a brighter note, Berkeley has already provided step-by-step guidance for faculties to learn the new tools. For example, RTL has provided a website that explains to instructors how to add course capture for their classes.[8] It includes a step-by-step walkthrough, an extensive Q&A section and a section for updates to keep instructors in the loop. With more buildings in the future be built or revamped to provide the necessary infrastructure and better guidance on implementation, there would be less barriers for instructors to use course capture and other technologies to facilitate classes in diverse ways to support students of all kinds.

STEM	No	Yes	cc_ratio
No	19271	47736	0.712403
Yes	24686	126782	0.837022

Table 8: CC Seats Score by STEM vs. Non-STEM Majors

Table 8 shows a comparison of course capture percentage by seats between STEM and non-STEM majors. It can be seen very clearly that STEM departments perform overall better than non-STEM ones. The reasons as mentioned above could be explained by less of a need for course capture technology and a stronger emphasis on in-person classroom interactions. However, as the pandemic changed the common perception of mode of instructions, more classes started to use course capture as either a backup or an alternative for students to learn the materials, while returning to an in-person-based instruction. It should be emphasized that having course capture

[8] "Course Capture," Course Capture | Research, Teaching, and Learning, https://rtl.berkeley.edu/services-programs/course-capture.

and other untraditional technology to support classes is not necessarily in opposition to in-person instructions. Rather, in a large school such as UC Berkeley, the proper combination of both approaches could benefit students who might want to participate in different classes but are constrained due to time commitment. Increasing the diversity for instructions for humanities and social sciences departments could be vital for recruiting interested students into their classrooms, even if in a virtual one.

college	No	Yes	cc_ratio
CED	96	86	0.472527
CNR	4482	6743	0.600713
CoC	933	12319	0.929596
CoE	2508	12174	0.829179
Haas	288	2478	0.895879
L&S	35650	140718	0.797866

Table 9: CC Seats Score by Colleges

Table 9 is a comparison among different colleges within UC Berkeley about the number of seats in their classrooms that is course capture capable. The College of Environmental Design (CED) has the lowest ratio, and College of Chemistry (CoC) and Haas School of Business (Haas) perform well with an around 90% ratio.

While CED's lowest score may imply that its infrastructure is lacking, it should be mentioned that most if not all classes host by this college is about designing which often requires lab sections. As helpful as course capture is, a lab section cannot be run without in-person engagement as students work in the actual classroom to build their materials. Thus, the use of course capture technology in CED is not as important as in other larger lectures. CoC and Haas' high scores, on the other hand, reflect the investment they receive. The College of Chemistry is often ranked as one of the best places to study all chemistry-related majors in the United States and the world. In the US News ranking and QS ranking of 2022, Berkeley's chemistry program ranks 2nd in America and

5th in the world respectively.[9] Haas' business management program also ranks 8th in America and 12th in the World.[10] What supports their academic prestige besides the excellent faculty is also the robust development of new buildings and classrooms. For example, Haas' Chou Hall is one of the first zero-waste building on campus, with all of its classrooms being able to conduct course captures. However, this state-of-the-art building costs 60 million, an expensive number for any other college to bear easily.[11] In comparison, the school newspaper Daily Cal reported in 2018 that the College of Letters and Science had a budget deficit of 383000 dollars.[12] With the pandemic exacerbating budgetary concerns, other colleges on campus may find it increasingly difficult to renovate their buildings or build new ones to incorporate new technology such as course capture. It would be up to the campus administration to decide how to maintain the rigor of Berkeley's academic excellence and a healthy budget.

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[9] "QS World University Rankings for Chemistry 2022," Top Universities (QS), https://www.topuniversities.com/university-rankings/university-subject-rankings/2022/chemistry. And "Best Chemistry Programs - Top Science Schools - US News Rankings" (US News), https://www.usnews.com/best-graduate-schools/top-science-schools/chemistry-rankings.

[10] "QS World University Rankings for Business & Management Studies 2022," Top Universities (QS), https://www.topuniversities.com/university-rankings/university-subject-rankings/2022/business-management-studies. And "2023 Best Business Schools (MBA) - US News Rankings" (US News), https://www.usnews.com/best-graduate-schools/top-business-schools/mba-rankings.

[11] "UC Berkeley Receives $25 Million Pledge for Haas School of Business," Philanthropy News Digest, https://philanthropynewsdigest.org/news/uc-berkeley-receives-25-million- pledge-for-haas-school-of-business.

[12] Audrey McNamara, "College of Letters and Science Bets on Philanthropy to Meet Budget Targets," The Daily Californian (The Daily Californian, August 15, 2017), https://www.dailycal.org/2017/08/14/college-letters-science-bets-philanthropy-meet-budget-targets/.

Implications and Relevance

There are several reasons as to why we need to care about having enough CCC. UC Berkeley's student body is diverse not only in races and genders, but also in terms of educational background and learning curves. In the same classroom there may be first-year, first-generation students, transfer juniors and DSP students. Course capture provides these students who often come to Berkeley without proper guidance on how to transition into college a convenient way to focus on their study, when lectures on a higher level became increasingly difficult. Secondly, as a campus of over 40 thousand students, UC Berkeley's physical space is more of a luxury than a commodity. It is extremely hard to add new classroom buildings on campus given the existing layout without demolishing others. Course capture in this way provides an opportunity for the school administration to reduce the overcrowding issue and enables more students to choose their preferred way of learning, whether that is in a physical classroom or a virtual one, especially now the latter has become more prevalent due to the pandemic.

As a data science major concentrating in the domain of Social Policy and Law, I am using this project to explore one of the many policies Berkeley has: the accommodations for its student population. By using actual data to examine the performance of campus accommodations, I would be able to investigate whether the school is fulfilling its promise to serve diversity and legal obligation to accommodate students with disabilities. This project could also allow me to learn more about how to provide recommendations based on data, something data analysts across industries should do.

The linkage to Human Contexts and Ethics in my project lies in the fact that the data I would be exploring could be a direct measurement of Berkeley's performance on its said commitment to students. The data collected in this project is used to explore how to help people,

and the end goal of the project based on such data is also to how could we do better with such commitment.

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