

Background and Problem: In 2016, the British Columbia (B.C.) government adopted a new curriculum based on personalized learning to better prepare students for the evolving demands of the 21st centuryⁱ. However, as per the latest student learning survey only about 30-40% of secondary students believe that schools prepare them for the jobs of the future or for post secondary educationⁱⁱ. As per BCTF's 2023 and 2024 teacher surveys, only 38% of the BC teachers agree that they have access to up-to-date curricular resourcesⁱⁱⁱ and less than 25% feel that students' academic (23.1%) or social and emotional (22.7%) needs were being "completely" or "very much" met^{iv}. Also, according to the McKinsey-Global teacher and student survey, 2023, (that included Canadian teachers), teachers work overtime but spend less than 50% of the time interacting with students. They found out that the biggest barriers in personalized learning were time, money, and resources^v. As per my observation and research, not just teachers even parents struggle with the resource gap. In the last five years, I have noticed parents around me spending approximately 1-2 hours each week finding resources for their children^{vi}. A research study of 4600 parents across 19 countries found out that parents were overwhelmed by technology and time constraints when trying to help their children^{vii}. Another study I read said that in today's world, the amount of information available on the internet is making it difficult for people to find what they are looking for^{viii}. All this resource underload and overload and student unpreparedness can be connected to Canada's productivity problem^{ix} which has been declared as an emergency^x. It also could be one reason why employers can't find people with the right skills^{xi}. Therefore, I came up with a small solution- The Resource Center.

The Solution: The Resource Center is a web platform with personalized resources for K-12 students, parents, and teachers in BC. It uses AI to solve two big problems: the resource overload/underload and the personalization gap in education. The resource center has three key features. 1) Broad Search which aims to solve the resource underload problem- If you want to find all relevant resources to your keywords you can use this feature. 2) Focused search which aims to solve the resource overload problem- If you want specific resources matching your specific needs, you can use this feature to generate specific results. 3) Personalized learning plan creator which is the most ingenious feature of the resource center- It takes the users profile and generates a pdf learning plan for the user creating an about section, a strengths and weaknesses section a specific goals section, and then matches those goals with specific resources to help the user achieve those goals.

The platform currently includes over 300 curated resources, from video lessons and community involvement programs to scholarship opportunities, interactive learning tools, and challenges. These resources are organized into five databases which have been created using web scraping and expert curation. It will use the same technologies to stay up to date.

The platform has a free plan and a subscription-based plan. The free plan allows users to use all three features of the platform i.e. broad search, focused search and create one-time personalized learning plans. The subscription-based plan allows users to save their learning plans, save resource searches and get personalized notifications about their searches as new information is added. The sign-in spaces also offer moderated forums where users sharing similar interests will be able to connect. Also, there is a suggestion box for all users to suggest or flag any resources.

Technical details: The Resource Center uses [HTML](#) and [CSS](#) to display the webpages, [JavaScript](#) for user interaction and client-side communication, and [CPython](#) as server-side controller. The Resource Center uses [Flask](#) to glue the website's individual pieces together, and it uses a fine-tuned [Phi-3](#) model (loaded using [transformers](#)) to generate PLP content and the module to convert them to PDFs. It uses a model architecture similar to one that you would use for sentiment analysis for quality detection, and it uses a mix of Natural Language Processing from [nltk](#), embedding similarity (Thanks to the pre-trained GloVe embedding, which was downloaded using [PyTorch](#)) and Term Frequency-Inverse Document Frequency (TF-IDF) for search functionalities. It uses the python module [sqlite3](#), the python interface for SQL, to read and write to SQL databases for things like user management. It uses [hashlib](#), [cryptography](#), and [dotenv](#) to keep The Resource Center's users secure. It will use [requests](#) to access up-to-date information about resources and [re\[gex\]](#) to parse them. A linear regression –

best-fit line was used to limit the number of results in broad search by giving the search functions a baseline on the minimum rating required to be considered a good rating. The website is currently being hosted by [DigitalOcean](#). It uses [waitress](#) as the server and [Nginx](#) as the reverse proxy. As the website usage grows it will be moved to [AWS](#) for scalability.

AI based features: The databases were created using web scraping and will use the same technology to stay updated. User created messages will be checked for toxicity and flagged automatically by a pre-trained [transformer model](#). For training the PLP generator, 130 dummy profiles across all student grades matching the BC demographic student profiles^{xii} have been created using more powerful external AI models like [GPT 4o](#) and [Perplexity AI](#). They have been used to train the initial AI model. Based on user feedback and further training using real anonymized data from families that volunteer this AI feature would be improved and trained.

Uniqueness: The Resource center is localized and trained on local data with many free features making it accessible. It is the only platform of its kind catering to K-12 students needs. Every other platform in the market is either for secondary or college students, or is paid or a worksheet generator. Platforms such as [Khanmigo](#) or [MagicSchool](#) are only remotely close as neither of them offer localized lists of resources tailored to the users needs. The BCTF has its [own resource repository](#) but is it mostly for lesson plans and does not have the wide variety of resources covered by the resource center. Also, there is no single platform yet that can create personalized learning plans for each student.

Impact: The resource center was shared with local parents and educators, and it received a 96% average rating for value it could add to students' education. The most in-demand features of the resource center were focused search and personalized learning plan creator^{xiii}. These findings corroborate with the McKinsey Global teachers survey that suggested that technologies like these could save 20% to 30% of teachers' time allowing them to spend more time with students^{xiv}.

Scope: 'The Resource Center' is beginning its journey in BC. Once successfully implemented and tested in BC, the project plans to expand its scope to include all of Canada and eventually a global audience. It will also add tools to support students with diverse needs.

ⁱ British Columbia Ministry of Education. (2016, September 6). *Ten things to know about B.C.'s new curriculum*. <https://news.gov.bc.ca/releases/2016EDUC0082-001558>

ⁱⁱ British Columbia Ministry of Education. (2023). *Post-secondary and career preparation: School District 099*. <https://studentsuccess.gov.bc.ca/school-district/099/report/post-secondary-career-prep>

ⁱⁱⁱ British Columbia Teachers' Federation (BCTF). (2023). *BCTF membership survey summary report 2022-2023*. <https://www.bctf.ca/docs/default-source/for-news-and-stories/bctf-membership-survey-summary-report-2022-2023.pdf>

^{iv} British Columbia Teachers' Federation (BCTF). (2024). *BCTF membership survey summary report 2023-2024*. https://www.bctf.ca/docs/default-source/for-news-and-stories/bctf-membership-survey-summary-report-2023-2024.pdf?sfvrsn=3bdb986c_2

^v McKinsey & Company. (2020). How artificial intelligence will impact K-12 teachers. <https://www.mckinsey.com/~media/McKinsey/Industries/Social%20Sector/Our%20Insights/How%20artificial%20intelligence%20will%20impact%20K%2012%20teachers/How-artificial-intelligence-will-impact-K-12-teachers.pdf>

^{vi} Observation.

^{vii} Frontiers in Psychology. (2021). Assessing the impact of pandemic-related school closures on students' learning outcomes. <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2021.719430/full>

^{viii} Shahrzadi, L., Mansouri, A., Alavi, M., & Shabani, A. (2024). Causes, consequences, and strategies to deal with information overload: A scoping review. *International Journal of Information Management Data Insights*, 4(2), 100261. <https://www.sciencedirect.com/science/article/pii/S2667096824000508>

^{ix} TD Economics. (2024, September 28). Canadian productivity: From bad to worse. <https://economics.td.com/ca-productivity-bad-to-worse>

^x Bank of Canada. (2024). Canada's productivity problem. <https://www.bankofcanada.ca/2024/03/productivity-problem/>

^{xi} C.D. Howe Institute. (2022, August). The effects of pandemic learning loss on long-term growth. https://www.cdhowe.org/sites/default/files/2022-08/Commentary_626_0.pdf

^{xii} Population Data BC. (2024). K to 12 student demographics and achievements data set.

https://www.popdata.bc.ca/data/education/student_demographics

^{xiii} https://docs.google.com/forms/d/1Jj1eh_nhPTS1cTZk-GtfwOCuUjAA3i6zX52k38vdPpY/edit#responses

^{xiv} McKinsey & Company. (2020). How artificial intelligence will impact K-12 teachers.

<https://www.mckinsey.com/~media/McKinsey/Industries/Social%20Sector/Our%20Insights/How%20artificial%20intelligence%20will%20impact%20K%2012%20teachers/How-artificial-intelligence-will-impact-K-12-teachers.pdf>

Important Notes:

1. The alpha version of the web application is live now showing some of its features to the public. It is accessible through theresourcecenter.ca or through <http://165.227.107.151/>. Due to resource constraints – need for higher paid servers it sometimes crashes. If it does crash, please try again or reach out to me on info@theresourcecenter.ca
2. GitHub Link: https://github.com/2point718281/TheResourceCenter_DigitalOcean