

Pustaka Karya: Jurnal Ilmiah Ilmu Perpustakaan dan Informasi
<http://dx.doi.org/10.18592/pk.v14i1.19005>
P. 49-59

Integrated framework of curriculum mapping through keyword tagging using Orange: public service logic approach

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received: 08 December 2025, revised: 20 February 2026, accepted: 24 May 2026

ABSTRACT

Comparable to other public service domains in which service provision involves a wide array of resource-integrating actors, higher education faces the challenge of delivering meaningful educational experiences. Adopting a service-logic perspective, this study proceeds from the assumption that such experiences can be shaped through the co-production of library services aligned with course curricula. Public Service Logic (PSL) provides the conceptual foundation for this co-creative integration, while the operationalization employs keyword tagging and relevance modeling in a case study of library practice at Politeknik Perkapalan Negeri Surabaya (PPNS). The analysis uses a neural network configured with a hidden layer of 100 neurons, ReLU activation, the Adam optimizer, L2 regularization (alpha), a specified maximum number of iterations, and a fixed random state. The model achieved precision and recall of 70 percent, indicating successful projection of similarity and relevance between the book collection and course offerings. Theoretically, the study advances the service-logic narrative in higher education by demonstrating integration of library resources with curriculum design.

Keywords: curriculum mapping; neural network; orange data mining; service-logic; similaritas

1. INTRODUCTION

A service-logic approach treats co-creation and co-production as a substantive philosophical shift, particularly within management discourse on firm–consumer interaction (Trischler et al., (2023). These concepts are frequently introduced in marketing (Tuunanen, et al., 2024). Micro they have also been extended to public services (Osborne, 2018). At the same time, given the sector’s complex societal dimensions, education likewise constitutes an arena for co-creation and co-production, with higher education institutions (HEIs), for example, acting as facilitators (Cruz et al., 2024; Vaillant, 2025). From a service-logic standpoint, HEIs are not producers of consumable products such as facilities, books, or even diplomas-though all of these function as service artifacts. Rather, the core of the offering is the educational experience, which involves a diversified constellation of actors, from admissions and instructional dialogue to student affairs, library services, and curriculum. Accordingly, in this view, the value proposition does not inhere in products but accompanies the unfolding of service processes as value-in-use.

Co-creation and co-production within HEIs can be conceived as interactional modes that transcend educational consumerism. Education is, after all, a public service domain. Students occupy multiple roles-as consumers of services, as learners, and as prospective human capital for other public spheres (e.g., the labor market). Consequently, co-production and co-creation are inherently multi-agency processes, implicating heterogeneous stakeholder perspectives, related institutions, and even prospective students, such that the service-logic lens aligns closely with Public Service Logic (PSL) (Osborne, 2018). Put differently, PSL contends that students are not merely end users of educational services; the service process encompasses a far more complex constellation of resource-integrating actors. Recent studies indicate that service-logic in HEIs

functions as a philosophical foundation for co-production in domains such as collaborative learning (Magni et al., 2020), instructor–student interaction (Dollinger & Lodge, 2020), and program-content co-production (Money et al., 2016). Yet co-production in HEIs remains underexamined with respect to integrating and aligning course topics with relevant scholarly resources. Although prior work (Money et al., 2016; Botha & Steyn, 2020) addresses the co-creation of learning materials, it does not specifically analyze co-production in curriculum alignment—particularly the congruence between syllabi and the literature.

Faculty and librarians constitute a subset of the many resource-integrating actors co-producing services within higher education. Their roles are pivotal to the design of pedagogically relevant systems, given the very core of the HEI educational experience (Nonthacumjane & Maceviciute (2022)). The urgency of this topic is evident in the literature, which reveals at least two salient trends. First, syllabus mining (syllabi mining) extracts course documents to identify academic needs—such as library provisioning—and to inform interventions that enhance learning services (Jeffery et al., 2017). Related work, for example Butler and Calcagno (2020), pursues a similar approach to evaluate the adequacy of library representation within curricula; however, such studies stop short of quantifying the degree of fit between course literature holdings and curricular requirements. Second, curriculum mapping emerges as an initiative to align curricula with library resources (LeMire & Graves, 2019). Yet, even where alignment is foregrounded, the emphasis typically remains at the program or policy level rather than on the instrumentation of co-production—namely, the concordance between specific bibliographic references and course plans (syllabi) at the individual course level. Addressing these limitations, the present study seeks to fill a lacuna in HEI co-creation discourse by examining the alignment between semester course plans (Rencana Pembelajaran Semester, RPS) and the relevance of course literature through a library information and technology lens.

This study adapts the conceptual foundations of Public Service Logic (PSL) as the locus through which co-production unfolds within library service systems. Under this lens, the academic library is re-positioned from a mere repository of literature to a facilitator of value creation for other resource-integrating actors—students, instructors, academic programs, and faculties. PSL further implies that libraries enable resource integration in ways that allow these actors to translate educational services into tangible outcomes. For example, libraries can help address the challenge of delivering experiential alignment between books and other scholarly materials and the semester’s instructional plans. More broadly, such initiatives comprise a core agenda for strengthening service-accountability metrics and processes, including making explicit the library’s contribution to the academic mission and the educational experience (Cooper et al., 2022). Nevertheless, prior research rarely specifies an actionable measurement workflow for evaluating, at the course level, the degree of fit between book holdings and relevant literature using extant catalog systems (Omeluzor & Oyovwe-Tinuoye, 2017).

At the technical level, this study seeks to elucidate the transformation of HEI library services toward a push-based paradigm by estimating the congruence between course-level reference book holdings and the keywords distilled from semester course plans (Rencana Pembelajaran Semester, RPS). The mechanism combines keyword tagging with modeling operationalized via the Orange software suite. The empirical setting is the library of Politeknik Perkapalan Negeri Surabaya. The inquiry is organized around three questions: first, in what ways does Public Service Logic furnish the conceptual foundation for co-creation within library services? second, how can keyword tagging be formalized into a model that estimates the degree of curriculum–collection fit at the course level? third, what criteria should guide the evaluation of curricular fit when modeling with Orange in the library context? Accordingly, the study contributes, first, a data-science–driven keyword-tagging model instrumented in Orange that derives subject keywords from extant RPS documents for individual courses and directly matches them to book-level metadata (i.e., titles and abstracts), summarizing the outputs into an indicator of curriculum relevance per course; and

second, a proof-of-concept instrument for push-based services that simultaneously advances the discourse on co-production and co-creation of library services within HEIs.

Theoretically, the PSL framework reinforces a collaborative agenda that positions students, faculty, and librarians as resource-integrating actors within the library service ecosystem. Its core premise holds that value is not delivered by the library but is created through interactions among integrator actors—including students—as they engage with the service (value in use). Put differently, the library in particular, and academic programs more broadly, facilitate and coordinate the value proposition (Osborne, 2018). Following this logic, the academic library shifts from a mere content (reference) supplier to an actor that facilitates curriculum co-production by integrating bibliographic resources into semester course plans. Integration here denotes the systematic linkage of library resources to course plans according to specific indicators—foremost, suitability or relevance (Martzoukou (2021). Conversely, academic programs are obliged to supply indicators that enable such alignment, for example by updating course components and articulating the corresponding instructional plan (syllabus).

Existing research on integrating library systems with curricular needs has largely remained at the level of external contributions—such as journal publishers—via recommender systems, as in Moonasar (2024). That study demonstrates that a university library recommender can operate more effectively by combining internal holdings with externally licensed collections. Nevertheless, despite its success in presenting hybridized information drawn from both external and internal sources, the study is marked by notable limitations. Chief among these are systemic barriers to third-party data aggregation, including restricted protocol access, privacy policies, and related constraints. Consequently, the proposed model does not fully capture a generalizable scope. Parallel work by Hamad, et al. (2024) addresses similar terrain; however, their outputs tend to foreground an appraisal of opportunities and challenges among the actors implicated in collection integration rather than offering a systemic, implementable integration model. By contrast, the integration of literature collections with course-specific curricular requirements remains underexamined—particularly from the vantage point of system design and integration modeling. This study addresses that gap.

2. METHODS

This study employs a quantitative, model-driven design using Orange Data Mining to extract and construct a keyword-tagging integration system. The analytic technique relies on similarity-based methods to map the relationships between book collections and individual courses. The objective is to automatically generate a ranked list of the most relevant books (degree of curricular fit) for each course, without requiring training data, via an unsupervised approach. The dataset comprises a corpus of references (books) represented by bibliographic metadata such as `id_buku`, title, and keywords/abstract/synopsis. The Orange pipeline is developed in two phases—training and testing—organized into four stages (Nguyen, 2024): data acquisition and cleansing; transformation of textual data into numeric representations; selection and training of the model; and evaluation with generalization testing.

Although the initial design emphasizes similarity-based mapping, this study ultimately implements a supervised classification approach, where course categories serve as target labels and bibliographic records as input features. The labeled dataset consists of course–reference associations, while 600 unlabeled records are used for inference. Text preprocessing includes lowercasing, removal of non-alphabetic characters, stopword filtering, and bigram construction, followed by TF–IDF vectorization. A Multi-Layer Perceptron (MLP) model is employed due to its ability to capture non-linear semantic relationships in high-dimensional text data, outperforming traditional methods such as Naïve Bayes and Support Vector Machines in complex classification tasks (Kowsari et al., 2019; Aggarwal, 2018).

3. RESULTS

As outlined in the methodology, this study employs Orange to construct the modeling pipeline. Two data types are used: course units as the categorical target variable and bibliographic lists together with subject matter descriptions as the principal textual variables. In addition, the test dataset comprises 600 instances without a target variable, as it is reserved for model inference. The Orange modeling widgets are presented as follows:

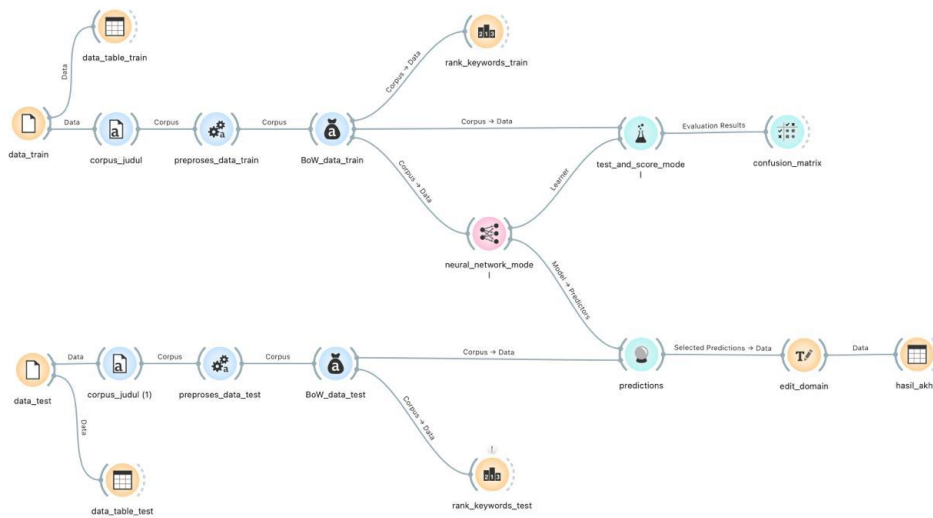


Figure 1. Workflow Text Analysis on Orange Data Mining

The dataset was partitioned into 80 percent for training and 20 percent for testing, predicated on the rationale that a model trained on a comparatively small subset yet evaluated against an expansive holdout population yields a more precise estimate of out-of-sample generalization (Sasse, et al. (2025).

Table 1. Example Data Training

No.	Study Program/Course	References and Learning Materials
1	D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / PERANCANGAN KAPAL	The Design of Merchant Ship
2	D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / PERANCANGAN KAPAL	Practical Ship Building
3	D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / PERANCANGAN KAPAL	Naval Architecture for Non-Naval Architects
4	D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / PERANCANGAN KAPAL	Distribution of Light Weight for Still Water Bending Moment Calculation
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...
43	D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / SISTEM PERLENGKAPAN KAPAL	Basic Principles of Ship Propulsion
44	D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / SISTEM PERLENGKAPAN KAPAL	Introduction to Marine Engineering
45	D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / SISTEM PERLENGKAPAN KAPAL	Design Principles of Ships and Marine Structures
46	D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / SISTEM PERLENGKAPAN KAPAL	Rules For Classification And Construction

Table 2. Example Data Test

No.	Inventory Number	Title	Author	Publisher	Year of Publication
1	7693	North star: focus on listening & speaking, high intermediate	Tess	Longman	1948
2	1840	Resistance propulsion and steering of ships	WPA von Lameren	The Technical	1948
3	1197	Fishing boats of the world 1	Jan Olaf T	Fishing News Books	1955
4	7828	Strength of materials part II advanced theory and problems E...	S. Timoshenko	D. Van Nostrand Company	1956
5	9538	process heat transfer	Donald Q Kern	McGrawHill	1965
...
...
42	11749	Electronic instrumentation fundamentals	Albert Paul Malvino	McGrawHill	1967
43	3454	Mengembangkan pengajaran kejuruan	Robert F Mager, Kenneth MB	ITB	1967
44	7174	Modern ship design	Thomas C. Gillmer	United States Naval Institute	1970
45	3073	Modern control engineering	Katsuhito Ogata	Prentice Hall	1970
46	3116	Red book of marine engineering	WB Peterson	Cornell Maritime	1971

The textual data was converted into a standardized digital corpus using English tokenization rules to accommodate the technical maritime terminology prevalent in the dataset. The pre-processing pipeline followed a rigorous and systematic sequence designed to reduce noise while maintaining semantic integrity: lowercasing for lexical standardization, regular-expression filtering to eliminate non-alphabetic characters and numerals, and stopword removal to focus on content-carrying terms. Furthermore, document-frequency filtering was applied in the relative range of 1–10% to balance the weights between common and rare terms, preventing dominant but non-informative words from skewing the results. A critical step in this pipeline was the construction of 1–2 n-grams to preserve complex multi-word technical expressions such as “ship design” or “marine propulsion,” which are often lost in unigram-only models. This procedure produced a refined lexical distribution of 571 tokens in the training set and 2,993 tokens in the test set, indicating adequate lexical breadth to support stable numerical representations (Sharami & Shterionov (2025)). Subsequently, the text was transformed into numerical vectors using a Bag-of-Words (BoW) model weighted by Term Frequency–Inverse Document Frequency (TF–IDF). This configuration, utilizing Count for term frequency and IDF for document frequency without regularization, was strategically selected to balance local document relevance against global corpus prevalence, resulting in a high-dimensional sparse feature matrix of 3,813 features.

The classification framework was executed using a Multi-Layer Perceptron (MLP) neural network architecture, configured with a hidden layer of 100 neurons, a Rectified Linear Unit (ReLU) activation function, and the Adam optimizer. The choice of the ReLU–Adam combination was predicated on its ability to exhibit stable learning behavior and faster convergence for high-dimensional, sparse representations compared to traditional sigmoidal functions (Ebied et al. (2025)). Evaluated through 10-repetition stratified 5-fold cross-validation to minimize bias, the model demonstrated exceptional reliability across primary metrics, achieving an AUC of 0.992, Accuracy of 0.770, and an F1-score of 0.754 (Nguyen, 2024). These outcomes indicate a highly favorable balance between precision and recall.

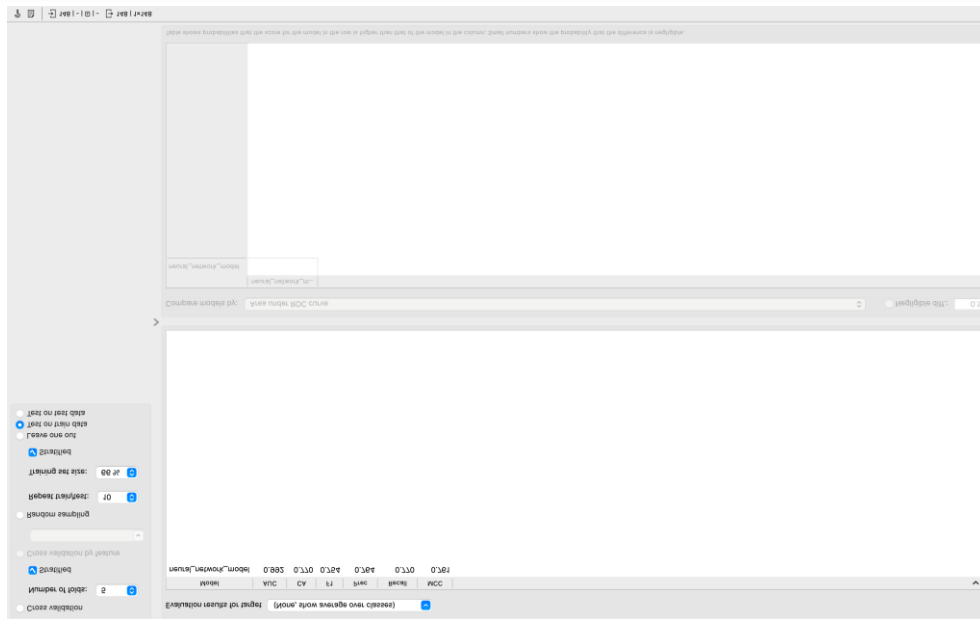


Figure 2. Confusion Matrix Summary

As illustrated in the Confusion Matrix, the high degree of concordance between true labels and model outputs confirms the effectiveness of the MLP in identifying document relevance. A closer inspection of the matrix reveals that misclassifications were primarily clustered in classes with significant semantic overlap, such as “Welding Technology” and “Welding Engineering/Processes,” where the lexical boundaries are naturally blurred even for human experts.

The deployment of this trained model on the test dataset facilitates a systematic mapping of book collections to specific course modules, which, under the Public Service Logic (PSL) approach, serves as a vital mechanism for value facilitation. In this context, the curriculum is viewed as a service provided by the institution, and the library collection serves as the resource base required for students to co-create value.

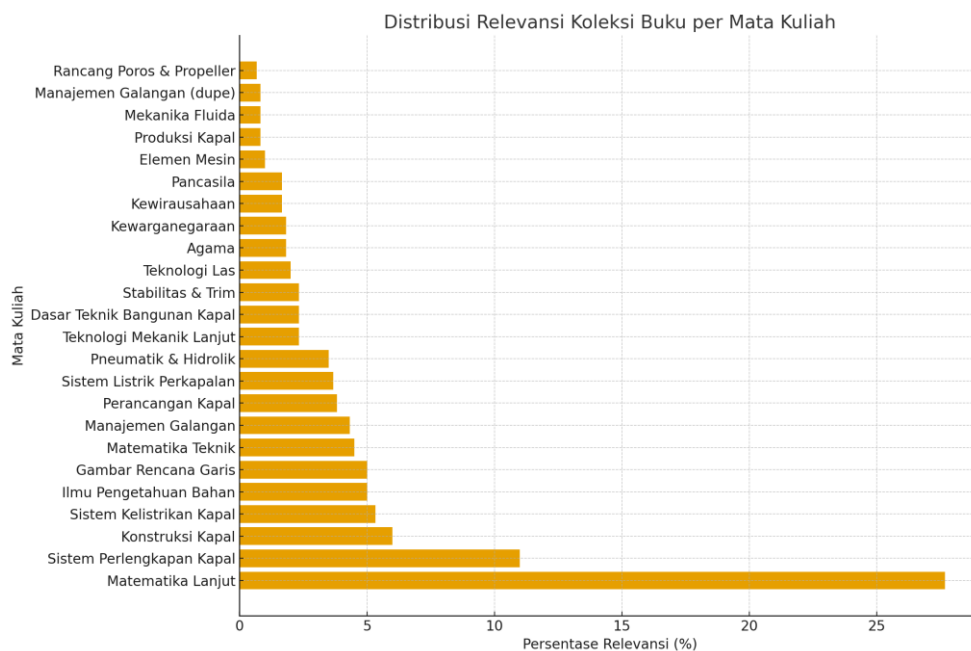


Figure 3. Relevance Distribution Chart

The analysis of these classification outputs reveals a notable unevenness in resource distribution across the instructional domain. Foundational courses command a disproportionately high share of resources; for instance, “Matematika Lanjut” ranks first with 166 relevant titles (27.67%), followed by “Sistem Perlengkapan Kapal” (11.00%) and “Konstruksi Kapal” (6.00%). This pattern suggests that foundational maritime domains tend to possess richer aligned reading resources, likely due to their broader academic nature.

Table 3. Book Title Relevance to Subject of Study

Study Program/Course	Number of Relevant References	Relevance (%)
D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / MATEMATIKA LANJUT	166	27.67%
D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / SISTEM PERLENGKAPAN KAPAL	66	11.00%
D4 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / KONSTRUKSI KAPAL	36	6.00%
D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / SISTEM KELISTRIKAN KAPAL	32	5.33%
D3 – TEKNIK PERMESINAN KAPAL / ILMU PENGETAHUAN BAHAN	30	5.00%
D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / TUGAS GAMBAR RENCANA GARIS	30	5.00%
D3 – TEKNIK PERMESINAN KAPAL / MATEMATIKA TEKNIK	27	4.50%
D4 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / MANAJEMEN GALANGAN	26	4.33%
D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / PERANCANGAN KAPAL	23	3.83%
D3 – TEKNIK PERMESINAN KAPAL / SISTEM LISTRIK PERKAPALAN	22	3.67%
D3 – TEKNIK PERMESINAN KAPAL / PRAKTEK PNEUMATIK DAN HIDROLIK	21	3.50%
D3 – TEKNIK PERMESINAN KAPAL / TEKNOLOGI MEKANIK LANJUT	14	2.33%
D3 – TEKNIK PERMESINAN KAPAL / DASAR TEKNIK BANGUNAN KAPAL	14	2.33%
D4 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / TUGAS GAMBAR STABILITAS, PELUNCURAN DAN TRIM	14	2.33%
D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / TEKNOLOGI LAS & PRAKTEK	12	2.00%
D3 – TEKNIK PERMESINAN KAPAL / AGAMA	11	1.83%
D3 – TEKNIK PERMESINAN KAPAL / KEWARGANEGARAAN	11	1.83%
D4 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / KEWIRAUSAHAAN	10	1.67%
D4 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / PANCASILA	10	1.67%
D3 – TEKNIK PERMESINAN KAPAL / ELEMEN MESIN	6	1.00%
D4 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / TUGAS GAMBAR PRODUKSI KAPAL	5	0.83%
D3 – TEKNIK PERMESINAN KAPAL / MEKANIKA FLUIDA	5	0.83%
D3 - TEKNIK PERANCANGAN DAN KONSTRUKSI KAPAL / MANAJEMEN GALANGAN	5	0.83%
D3 – TEKNIK PERMESINAN KAPAL / TUGAS RANCANG POROS, STERN TUBE DAN PROPELLER	4	0.67%
Grand Total	600	100.00%

Conversely, specialized applied courses such as “Tugas Rancang Poros, Stern Tube, dan Propeller” and “Tugas Gambar Produksi Kapal” register relevance scores below 1%. From a PSL perspective, these findings highlight a structural gap or "service failure" in the instructional ecosystem. While foundational subjects are well-supported, the scarcity of aligned literature for advanced specialized modules indicates a potential bottleneck in the student's ability to achieve deep learning through independent research. This integrated framework, therefore, does not merely categorize data but acts as a diagnostic tool for curriculum auditors. It provides a data-driven basis for strategic resource procurement and curriculum realignment, ensuring that the public service of education is supported by a balanced, accessible, and semantically aligned knowledge repository.

4. DISCUSSION

The findings of this study demonstrate that the proposed model is capable of effectively mapping the relevance between library collections and course curricula, as indicated by the relatively high classification performance (accuracy = 0.770; F1-score = 0.754). These results suggest that the integration of keyword tagging and supervised learning can successfully capture semantic relationships between bibliographic records and instructional content. Notably, the uneven distribution of relevant resources across courses—where foundational subjects such as advanced mathematics dominate—indicates structural imbalances in collection alignment. This pattern reflects the inherent differences in knowledge domains, where foundational courses tend to have broader and more standardized literature bases, whereas specialized courses rely on niche and less-represented resources.

From the perspective of Public Service Logic (PSL), these findings reinforce the notion that value is co-created through interactions among multiple actors within the service ecosystem, rather than delivered unilaterally by the institution (Osborne, 2018). In this context, the library functions not merely as a passive repository but as an active facilitator of value creation by aligning its collections with curricular needs. The model developed in this study operationalizes PSL by enabling the integration of resources across actors—librarians, faculty, and students—thus supporting value-in-use within the educational process. Furthermore, the identification of gaps in resource alignment, particularly in specialized courses, can be interpreted as instances of “service failure” within the PSL framework, where insufficient resource integration limits the co-creation of educational value.

When compared with prior studies, this research extends the existing literature in several important ways. Previous work on syllabus mining has primarily focused on identifying instructional needs and informing library services (Jeffery et al., 2017; Butler & Calcagno, 2020), while curriculum mapping initiatives have emphasized program-level alignment rather than granular, course-level integration (LeMire & Graves, 2019). Similarly, studies on co-creation in higher education have largely explored pedagogical interactions, such as collaborative learning and student engagement (Dollinger & Lodge, 2020; Magni et al., 2020; Money et al., 2016), without addressing the technical mechanisms required to align curricular content with library resources. This study contributes by introducing a data-driven, implementable model that bridges this gap, offering a concrete method for operationalizing co-production through text-based similarity and classification techniques.

The practical implications of this study are significant for higher education institutions, particularly in the context of library management and curriculum development. The model provides a diagnostic tool that enables librarians and academic program managers to assess the degree of alignment between collections and course requirements. This can inform strategic decision-making in collection development, resource allocation, and curriculum revision. Moreover, the framework supports the transition toward push-based library services, where relevant resources are proactively recommended based on curricular needs, thereby enhancing the efficiency and effectiveness of learning support systems (Omeluzor & Oyovwe-Tinuoye, 2017). By leveraging digital tools such as Orange Data Mining, institutions can also strengthen their data-

driven governance practices and improve accountability in delivering educational services (Cooper et al., 2022).

Despite these contributions, this study is subject to several limitations. First, the dataset is relatively constrained in scope, both in terms of the number of labeled training instances and the institutional context, which may limit the generalizability of the findings. Second, the reliance on bibliographic metadata (titles and abstracts) may not fully capture the depth of content required for precise semantic matching. Third, while the MLP model demonstrates adequate performance, the study does not include a comparative evaluation against alternative models such as Support Vector Machines or Naïve Bayes, which could provide additional insights into model robustness. Finally, the analysis focuses primarily on relevance estimation and does not yet extend to real-time recommendation systems or user interaction data, which are critical components of fully realized co-creation in digital library ecosystems. Future research should address these limitations by incorporating larger datasets, richer textual features, and comparative modeling approaches, as well as by exploring the integration of user feedback into the co-production process.

5. CONCLUSIONS

This study positions Public Service Logic (PSL) as the conceptual foundation for integrating library services within higher education. The PSL abstraction is instantiated through the co-production of integration between library collections and the relevance requirements of semester course plans at Politeknik Perkapalan Negeri Surabaya. The Orange-based modeling configuration indicates substantive alignment between book holdings and course RPS, yielding a relevance (test score) of approximately seventy percent, as reflected in the model's precision and recall. This evidences the feasibility of co-production among librarians, instructors, and academic programs. The findings suggest that such co-production enhances service delivery in support of educational processes within HEIs. Theoretically, the study advances the service-logic narrative in higher education by demonstrating integration between library resources and curricular design. It also contributes to discourses on curriculum mapping and the integration of book collections. Practically, the proposed model illustrates the capabilities of library digitization for managerial use while serving as an initial blueprint to support teaching and learning. Meanwhile, This study is not without limitations. The convenient technique of instance counts may introduce sampling bias, and subsequent research should employ more robust approaches to capture larger datasets. Moreover, the present analysis is confined to relevance modeling; future work might extend to analogous systems, for example, push-based services. Taken together, the study opens an avenue for leveraging digitization to co-produce services in the higher education institution sector.

REFERENCES

- Aggarwal, C. C. (2018). *Machine Learning for Text*. Springer. <https://doi.org/10.1007/978-3-319-73531-3>
- Botha, A. J. M., & Steyn, A. A. (2020). Student–faculty partnership in design: Evaluating a co-creation practice and sharing of findings within the South African higher education context. *South African Journal of Higher Education*, 34(5), 166–176. <https://doi.org/10.20853/34-5-4270>
- Butler, K., & Calcagno, T. (2020). Syllabus mining for information literacy instruction: A scoping review. *Evidence Based Library and Information Practice*, 15(4), 83–104. <https://doi.org/10.18438/eblip29800>
- Cooper, D. M., Ruediger, D., & Skinner, M. (2022). Streaming media licensing and purchasing practices at academic libraries: Survey results. Ithaka. <https://doi.org/10.18665/sr.316793>
- Cruz, M. de F., Alves, H., & Gouveia Rodrigues, R. (2024). A service-dominant logic of co-creation in higher education: Emerging topics and conceptualizations. *Journal of Marketing for Higher Education*, 34(2), 920–945. <https://doi.org/10.1080/08841241.2022.2134957>

- Dollinger, M., & Lodge, J. (2020). Student–staff co-creation in higher education: An evidence-informed model to support future design and implementation. *Journal of Higher Education Policy and Management*, 42(5), 532–546. <https://doi.org/10.1080/1360080X.2019.1663681>
- Ebied, M. A., Hamdy, W., & Shehta, A. I. (2025). Impact of optimization algorithms and regularization techniques on neural network performance for binary classification. *IEEE Conference Proceedings*. <https://ieeexplore.ieee.org/document/11384307/>
- Hamad, F., Al-Fadel, M., & Shehata, A. M. K. (2024). The level of digital competencies for the provision of smart information service at academic libraries in Jordan. *Global Knowledge, Memory and Communication*, 73(4/5), 614–632. <https://doi.org/10.1108/GKMC-06-2022-0131>
- Jeffery, K. M., Houk, K. M., Nielsen, J. M., & Wong-Welch, J. M. (2017). Digging in the mines: Mining course syllabi in search of the library. *Evidence Based Library and Information Practice*, 12(1), 72–84. <https://doi.org/10.18438/B8GP81>
- Kowsari, K., et al. (2019). Text classification algorithms: A survey. *Information*, 10(4), 150. <https://doi.org/10.3390/info10040150>
- LeMire, S., & Graves, S. J. (2019). Mapping out a strategy: Curriculum mapping applied to outreach and instruction programs. *College & Research Libraries*, 80(2), 273–288. <https://doi.org/10.5860/crl.80.2.273>
- Magni, D., Pezzi, A., & Vrontis, D. (2020). Towards a framework of students’ co-creation behaviour in higher education institutions. *International Journal of Managerial and Financial Accounting*, 12(2), 119–148. <https://doi.org/10.1504/IJMFA.2020.109129>
- Martzoukou, K. (2021). Academic libraries in COVID-19: A renewed mission for digital literacy. *Library Management*, 42(4–5), 266–276.
- Money, J., Dinning, T., Nixon, S., Walsh, B., & Magill, C. (2016). Co-creating a blended learning curriculum in transition to higher education: A student viewpoint. *Creative Education*, 7(9), 1205–1213. <https://doi.org/10.4236/ce.2016.79126>
- Moonasar, A. (2024). Continuing professional development and the changing landscape of academic libraries. *Library Management*, 45(3/4), 226–240. <https://doi.org/10.1108/LM-09-2023-0100>
- Nguyen, D. A. (2024). Efficient tuning of automated machine learning pipelines. Leiden University. Online access: <https://scholarlypublications.universiteitleiden.nl/access/item%3A4094134/download>
- Nonthacumjane, P., & Maceviciute, E. (2022). Organizational aspects of collaboration on local information management by Thai provincial university libraries. *Journal of Library Administration*, 62(6), 707–726. <https://doi.org/10.1080/01930826.2022.2102380>
- Omeluzor, S. U., & Oyovwe-Tinuoye, G. O. (2017). Assessment of information and communication technology for selective dissemination of information and current awareness services: A case study of university libraries in the South-West Zone of Nigeria. *Evidence Based Library and Information Practice*, 12(4), 233–249. <https://doi.org/10.18438/B84X09>
- Osborne, S. P. (2018). From public service-dominant logic to public service logic: Are public service organizations capable of co-production and value co-creation? *Public Management Review*, 20(2), 225–231. <https://doi.org/10.1080/14719037.2017.1350461>
- Sasse, L., Nicolaisen-Sobesky, E., Dukart, J., & Eickhoff, S. B. (2025). Overview of leakage scenarios in supervised machine learning. *Journal of Big Data*, 12(1). <https://doi.org/10.1186/s40537-025-01193-8>
- Sharami, J. P. R., & Shterionov, D. (2025). Analysis of vocabulary and subword tokenization settings for optimal fine-tuning of MT: A case study of in-domain translation. *Recent Advances in Natural Language Processing*.
- Trischler, J., Røhnebæk, M., & Edvardsson, B. (2023). Advancing public service logic: Moving towards an ecosystemic framework for value creation in the public service context. *Public Management Review*. <https://doi.org/10.1080/14719037.2023.2229836>

- Tuunanen, T., Lumivalo, J., Vartiainen, T., & others. (2024). Micro-level mechanisms to support value co-creation for design of digital services. *Journal of Service Research*. <https://doi.org/10.1177/10946705231173116>
- Vaillant, Y., & Lafuente, E. (2025). Higher education institutions as co-innovation partners: Compensating, complementing, and facilitating firms' co-innovation to their optimum possibility frontier. *The Journal of Technology Transfer*. <https://doi.org/10.1007/s10961-025-10196-9>