

Risks and Governance Paths of the Internal Circulation of College Students' Knowledge Structures Under the Intervention of Generative Intelligence

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Abstract: In the current digitalization process of higher education oriented towards independent and self-reliant science and technology, generative intelligence has become an important tool for college students' daily learning. Compared with traditional information acquisition methods, generative intelligence has significant advantages in speed, presentation form, and structured expression. However, the corpus circulation and content regeneration mechanisms behind its operation are quietly changing students' knowledge source structures, learning path logic, and cognitive formation methods. When the text supply enters a contraction cycle, it becomes normal for models to rely on internally regenerated content for training. Students gradually form a dependence on regenerated knowledge in the learning process, making the knowledge structure shift from external expansion to internal circulation. Phenomena such as the convergence of knowledge content, the single-path nature of expression structures, and the blurring of conceptual boundaries continue to accumulate, leading to a stable deviation in the cognitive foundation. This structural change not only affects learning quality but may also weaken students' academic judgment, value recognition ability, and theoretical innovation ability. To address this trend, higher education needs to construct a systematic governance path from three dimensions: knowledge supply, learning structure, and value guidance. By expanding the boundaries of knowledge sources, reconstructing in-depth learning structures, and strengthening value-oriented intervention, students can maintain the openness, hierarchy, and value stability of their knowledge structures while using generative intelligence, and promote the formation of real learning abilities.

Keywords: Artificial Intelligence; Knowledge structure; Higher education; Generative content

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1. Realistic roots of generative intelligence promoting the internal circulation of students' knowledge structures

Generative artificial intelligence is reshaping the teaching paradigm and injecting new momentum into the digital transformation of education^[1]. Characterized by rapid integration, structured presentation, and real-time feedback, it has significantly changed students' knowledge acquisition methods. However, behind the improvement in generation speed, there are deep-seated mechanisms such as corpus contraction, content regeneration, and the convergence of expression models, which are leading to structural reshaping of students' knowledge sources, thinking paths, and value judgments.

Understanding the generation mechanism of the internal circulation of knowledge structures is a prerequisite for subsequent governance and educational reconstruction.

1.1. Corpus contraction causes knowledge sources to shift from external expansion to internal circulation

Against the backdrop of the rapid iteration of artificial intelligence technology, the growth rate of high-quality online texts cannot match the expansion of model training scales. The cycle constraints of academic publishing, the threshold for original content generation, and the slowdown in the growth of digital resources have led to a year-on-year decline in the increment of external corpora. When original corpora can no longer continuously meet the needs of model expansion, generative intelligence has to rely on its internal content for cyclic training. Models continuously complete, rewrite, and splice based on internal semantic paths, thereby gradually increasing the proportion of regenerated content ^[2].

When college students use generative tools in learning, what they receive is actually such content processed through internal circulation. This type of content is often characterized by stable structures, common concepts, and generalized expressions. Compared with original materials, theoretical texts, and academic materials, it has fewer sources, weaker differences, and smaller tensions. Since students find it difficult to distinguish between regenerated content and original knowledge, the starting point of knowledge gradually shifts from external literature to the model's internal semantic structure, forming a typical input contraction. In this process, the boundaries of knowledge are narrowed, the ideological perspective loses extensibility, and the motivation for outward exploration of academic cognition is weakened.

1.2. Regenerated content strengthens the convergence of expression models and weakens the multi-source nature of knowledge

When answering questions, generative intelligence tends to use high-frequency and stable expression paths to ensure the coherence and comprehensibility of content. Through statistical learning of a large number of corpora, models have formed a set of expression methods that are most easily accepted, including specific structural arrangements, common concept combinations, and conventional argumentation methods. In the process of frequently using generative tools, students gradually become familiar with and rely on this inertial expression ^[3].

When students lack continuous original reading experience, the expression framework of the model is often mistaken for a universally applicable knowledge structure, leading to the constant repetition of these frameworks in writing, thinking, and discussions. The expression differences between different individuals are reduced, and the innovation space of text structures is narrowed. The increasing homogenization of knowledge expression weakens the ability of in-depth understanding and personalized expression ^[4]. The convergence of expression not only affects writing ability but also impacts the diversity of knowledge sources.

1.3. The linearization of learning paths and the weakening of value judgment jointly accelerate the internal contraction of knowledge structures

The application of generative intelligence has significantly reduced the time cost of learning, enabling students to obtain structurally complete answers with minimal effort. Traditional learning requires going through material screening, source verification, viewpoint comparison, and logical construction, while generative tools can provide formed content with a single question. This convenience has made learning paths gradually linear, and students are more inclined to directly accept answers rather than actively construct learning chains.

When the complexity of learning paths is weakened and the cognitive chain is shortened, the ability of in-depth thinking and reverse reasoning decreases accordingly ^[5]. Knowledge that originally needed to be formed through reading, comparison, and sorting is replaced by stylized expression packages. Students' learning behavior shifts from inquiry-based to receptive, and receptive learning is most likely to strengthen internal circulation, making the knowledge structure lose the motivation for external extension. At the same time, generative content inherently contains the value orientation of its

training corpora.

2. Risks of internal circulation to college students' knowledge structures and their deep evolutionary logic

Its impact is not limited to technical changes in learning paths but profoundly affects ideological cognition, academic judgment, and value choices^[6]. When students increasingly rely on internally generated content in learning, the role of original documents, theoretical traditions, and academic debates is continuously weakened, and the knowledge system gradually shifts to a self-consistent structure centered on regenerated content. To understand the risks of knowledge internal circulation, it is not enough to merely point out content convergence or source contraction; it is also necessary to deeply analyze its structural evolution mechanism.

2.1. The contraction of knowledge sources promotes content single-path and weakens the multi-dimensional structure of learning

The most significant risk of internal circulation is reflected in the contraction of knowledge sources. Traditional learning relies on extensive reading and cross-disciplinary exploration to form a hierarchical and complex knowledge structure. Students need to distinguish differences among multiple texts, form judgments from multiple perspectives, and establish connections between multiple disciplines. However, when generative intelligence becomes the main carrier of knowledge, there is an obvious change in source distribution. Students gradually regard model outputs as sufficient materials and no longer take the initiative to find original documents or compare multiple theoretical paths.

A direct consequence of source contraction is content single-path. Based on generative content, students often refine along the main path provided by the model, rather than pursuing heterogeneous materials that can provide tension, conflict, or corrective significance. Knowledge seems rich, but its internal logic is highly consistent, with no formation of viewpoint differences or theoretical collisions. This structure weakens the key academic characteristic, namely the ability to understand complexity. A knowledge structure lacking multi-source input cannot support in-depth thinking, nor can it maintain the necessary extensibility when facing new problems. Content single-path also weakens students' ability to explore issues. Since learning is locked into a single path, students find it difficult to form an open-minded thinking attitude and face uncertainty and complexity.

2.2. The convergence of expression structures leads to the decline of innovation motivation and weakens academic judgment

Generative intelligence constructs expression structures based on statistical laws, and its output content often has a stable framework in form. For example, common linear presentation structures, concept-corresponding structures, and segmental combination structures. Such structures have advantages such as high readability and easy understanding in learning, but long-term dependence will make students' expression methods show obvious convergence.

Expression convergence first weakens innovation motivation. Academic innovation often relies on breakthroughs in expression methods and the reorganization of logical frameworks, while the structures provided by generative content are highly predictable. In repeated use, students gradually consider this as the most natural and effective expression method, thus automatically replicating these structures in writing and argumentation. With the continuous solidification of the expression framework, theoretical thinking is difficult to generate new connections and combinations, the fluidity of ideas decreases, and innovation ability is gradually compressed. Expression convergence also directly affects academic judgment. The core of academic judgment is the ability to identify viewpoint differences and analyze argument structures, while generative content often replaces theoretical details with generalized expressions and logical tension with structural stability. After frequent exposure to such expressions, students' ability to recognize complex structures decreases, their sensitivity to concept differences weakens, and their clarity in identifying theoretical positions is lost. The blurring of

conceptual boundaries is also worsening against the background of expression convergence.

2.3. Internal circulation solidifies value biases and narrows the open scope of the ideological dwelling space

The internal circulation of generative intelligence not only affects knowledge structures and expression models but also profoundly acts on the value system. When students rely on model-provided content for a long time, they are actually continuously accepting the value orientation contained in its corpora. Since students find it difficult to restore the source of corpora in learning and cannot judge the implicit theoretical positions behind the content, value biases may be internalized unconsciously.

The solidification of value biases is concealed. Model outputs tend to present common value models in the corpora rather than showing value differences or theoretical conflicts. When students continuously accept such unified value expressions, their judgment ability gradually weakens, and value perception becomes passive. Value choices lack comparison, analysis, and in-depth thinking. Value biases are continuously strengthened in internal circulation, making students' judgment systems lose autonomy. The ideological dwelling space thus gradually narrows. The openness of thought relies on the intersection of multiple cultures, multiple theories, and multiple experiences. When learning sources, expression structures, and value positions are concentrated within a single semantic system, thinking no longer extends outward but continuously consolidates the existing structure in internal circulation. Students' theoretical horizons are substantially limited, and it is difficult for them to form a comprehensive understanding and historical judgment when facing social reality issues. This structural contraction not only affects personal learning and growth but also challenges the value goals of higher education^[7]. Higher education emphasizes independent spirit, critical awareness, and innovation ability, while the value solidification and thinking closure brought about by internal circulation are in deep opposition to these goals, making the overall quality of talent training face structural risks.

3. Governance paths for colleges and universities to address the internal circulation of knowledge structures

3.1. Expand the boundaries of knowledge sources and construct an open learning system

Firstly, at the classroom teaching level, teachers should strengthen the reading of original documents and guide students to directly contact theoretical texts, historical materials, and academic papers^[8]. This not only enables students to understand the generative background of concepts and the logical structure of theories but also allows them to jump out of the expression framework of generative content in terms of semantic depth and ideological density. Secondly, the curriculum system should further increase cross-disciplinary reading training, enabling students to continuously introduce knowledge from different fields in learning and form cognitive tension through heterogeneous materials. Cross-disciplinary reading not only expands knowledge sources but also cultivates students' ability to break single-path thinking. In addition, in terms of resource supply, libraries should construct multi-source retrieval schemes for students, providing a full-chain source from classic materials to the latest research, and reducing the threshold for students to obtain multi-source materials through reading navigation, retrieval training, and literature path recommendation. Teachers also need to guide students to identify the sources of generative content in class, enabling them to understand the differences between model expressions and academic materials through source analysis, and clarify what constitutes regenerated content and what constitutes original knowledge^[9].

From the perspective of technology development and application, colleges and universities should innovate and develop school moral education wisdom databases according to practical needs, and adopt technical means such as data integration and sharing platforms to promote data integration and sharing^[10]. Only with the continuous input of multi-source knowledge can students' knowledge structures be re-opened outward. External expansion is not only a path for knowledge growth but also an important foundation for forming judgment ability and academic sensitivity, and is the

primary measure to address the internal circulation of knowledge.

3.2. Reconstruct in-depth learning structures and repair the chain generation mechanism of knowledge

Firstly, curriculum design should emphasize question chains, promoting in-depth learning through continuous questioning logic. For example, from phenomenon identification to concept analysis, then to theoretical derivation, and finally to practical explanation, enabling students to construct a progressive problem framework. The training of question chains prevents students from staying on the surface of generated answers and requires them to experience the advancement of thinking paths. Secondly, students should be guided to carry out reverse reasoning training from experience to theory through cases. Cases provide a material foundation, and theories provide an explanatory framework, requiring students to establish connections between the two. Reverse reasoning training not only strengthens theoretical understanding but also enables students to recognize the structural gap between model expressions and theoretical systems, reducing the risk of over-reliance on generative content. In addition, colleges and universities should promote in-depth writing courses, allowing students to return to the construction of argument chains. In-depth writing requires students to define concepts, arrange logic, and use materials, putting the learning process back into an active construction state.

Through the associated training of question chains, case reasoning, and in-depth writing, learning will shift from linear acceptance to structural construction. The restoration of the knowledge chain means that students have re-mastered the complete process of understanding, analysis, judgment, and expression, and also means the loosening of the internal circulation structure. Only after the chain is reconstructed can learning ability, thinking depth, and theoretical sensitivity be truly restored.

3.3. Strengthen academic and value judgment and construct educational norms in the intelligent era

Firstly, colleges and universities should strengthen the cultivation of concept boundary awareness. Courses on the history of theories, concept analysis, and classic reading can all help students understand the historical context and academic differentiation of concepts, enabling them to distinguish theoretical paths, identify viewpoint differences, and thus judge whether there is generalization or mixing problems when facing regenerated content. When students have a clear concept framework, model content cannot easily replace their analytical ability. Secondly, colleges and universities should strengthen value guidance, enabling students to maintain a stable position amid potential biases. Value guidance is not abstract but should be continuously reflected in courses, classroom discussions, and case analyses. Teachers should guide students to understand the connection between knowledge and values, identify the positional orientation in model expressions, and form value awareness through multi-perspective analysis training. The formation of value judgment ability is an important foundation for preventing the solidification of value biases by regenerated content^[11]. In addition, it is necessary to promote the remodeling of the learning ecology. Colleges and universities should formulate intelligent use norms for students, covering learning, writing, assignments, scientific research, and other fields^[12]. The core of the norms is not to restrict technology but to enable students to understand the boundaries of technology, making technology an auxiliary to learning rather than a substitute for cognition^[13]. Under the guidance of norms, students can maintain an active learning state and retain the necessary analysis, judgment, and prudence when using intelligent tools.

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