Asian Journal of Technology and Applied Sciences
ISSN: 2301-xxxx (online) | IF: 10.01 | Vol: 1, issue 1
Available: http://asiansciencejournal.org

THE CATEGORICAL APPARATUS OF THE RESEARCH: THE SCIENTIFIC-PEDAGOGICAL ESSENCE AND INTERRELATION OF THE CONCEPTS "DIFFERENTIATION," "DIFFERENTIATED APPROACH," AND "DIFFERENTIATED INSTRUCTION"

Turgunov Mirzaxamdam o'g'li
PhD (p.f.b.f.d.)
Senior Lecturer, Department of Inclusive Education, Fergana State University
E-mail: mirjalolturgunov20@gmail.com
ORCID: https://orcid.org/0009-0008-1957-1555

Abstract: The precision of a scientific study depends directly on the clarity of its categorical apparatus. In contemporary pedagogical literature the terms "differentiation," "differentiated approach," and "differentiated instruction" are frequently used as synonyms, which generates terminological inconsistency and weakens the methodological foundation of research, particularly in the field of inclusive education. The purpose of this article is to clarify the scientific-pedagogical essence of these three concepts and to establish the logical and functional relationship among them. The study employs theoretical methods: etymological-terminological analysis, comparative-conceptual analysis, content analysis of foreign and post-Soviet pedagogical sources, systematization, and logical-structural modelling. The results demonstrate that the three concepts are not synonymous but form a vertically nested, three-level system: differentiation functions as a general scientific and pedagogical category (the genus concept), the differentiated approach operates as a methodological principle and strategic orientation, and differentiated instruction represents the procedural-technological level of practical realization. The article proposes a "category – principle – process" model that resolves the conceptual overlap and provides a coherent terminological basis for further empirical research on adapting teaching to learner diversity in inclusive settings.

Keywords: categorical apparatus, differentiation, differentiated approach, differentiated instruction.

Introduction

The development of any scientific field is inseparable from the rigour of its conceptual–categorical apparatus. Categories and concepts are not merely linguistic labels; they fix the boundaries of a phenomenon, encode the logic of relationships between phenomena, and make scientific communication and the accumulation of knowledge possible. When key terms are used vaguely or interchangeably, the validity of a study is undermined before any data are gathered, because the object of inquiry itself remains blurred. For this reason, the elaboration of the categorical apparatus is not a preliminary formality but a substantive task of pedagogical methodology.

In modern pedagogical theory and practice, the cluster of concepts associated with adapting education to learner diversity occupies a central position. Three terms in particular — "differentiation," "differentiated approach," and "differentiated instruction" — appear repeatedly in dissertations, textbooks, and methodological recommendations. However, a close reading of the literature shows that these terms are often treated as full synonyms or substituted for one another without explanation. As a result, the same word may denote at one moment a broad organizational regularity, at another a teacher's methodological stance, and at yet another a concrete set of classroom techniques.

This terminological diffusion is particularly consequential for **inclusive education**, where adapting the educational process to the heterogeneous needs, abilities, and learning profiles of students is not an optional enhancement but a structural requirement. If researchers and practitioners cannot distinguish between the general principle of accounting for differences and the specific technology of implementing that principle in a lesson, both the design of studies and the preparation of teachers lose their precision.

Accordingly, the **aim** of this article is to clarify the scientific-pedagogical essence of the concepts "differentiation," "differentiated approach," and "differentiated instruction" and to substantiate the logical and functional relationship among them. To achieve this aim, the following **objectives** were set: (1) to reveal the meaning and scientific status of each concept on the basis of etymological and conceptual analysis; (2) to compare the concepts across a set of methodological parameters; and (3) to construct a structural model that represents their interrelation in a single coherent system.

Materials and Methods

The present study is theoretical and conceptual in nature; its object is not an empirical educational process but the system of scientific concepts that describe that process. The design therefore follows the logic of a methodological–terminological inquiry rather than an experimental one. The research was carried out using a complex of interrelated theoretical methods.

Etymological–terminological analysis was used to trace the original meaning of the core terms and to identify the semantic nucleus that each of them retains in pedagogical usage. **Comparative–conceptual analysis** served to set the three concepts against one another and to detect the points at which their meanings converge and diverge. **Content analysis** of the scholarly literature was applied to a corpus of foreign (primarily English-language) and post-Soviet sources in order to reconstruct how each concept is defined and operationalized by leading authors.

In addition, the methods of **systematization and generalization** were employed to order the accumulated definitions according to their scientific status, and the method of **logical–structural modelling** was used to express the established relationships in the form of a hierarchical "category – principle – process" model. The analysis was guided by the categorial distinction between a *category* (a general concept that fixes an objective regularity), a *principle* (a regulative idea that orients activity), and a *process / technology* (the operational realization of that idea), which made it possible to assign each of the three studied concepts to its proper level.

The source base combined two research traditions. The first is the Western framework of *differentiated instruction*, most fully articulated by C. A. Tomlinson and developed by P. Subban, T. Hall and colleagues, A. Roy and colleagues, and others. The second is the post-Soviet tradition of *individualization and differentiation of instruction*, represented by I. Unt, E. S. Rabunsky, A. A. Kirsanov, and related authors. Bringing the two traditions into dialogue allowed the concepts to be examined without reducing them to a single national school of thought.

3. Results

3.1. Differentiation as a general scientific and pedagogical category

The term "differentiation" derives from the Latin *differentia* — difference, distinction. In its broadest, general-scientific sense it denotes the process and the result of dividing a previously undivided whole into qualitatively distinct parts, levels, or functions. The concept is used across philosophy, biology, sociology, and systems theory, where it consistently

expresses the same idea: the emergence of internal heterogeneity within a system. This general meaning is the semantic nucleus that pedagogy inherits.

Transferred into pedagogy, differentiation designates the organization of the educational process in a way that takes systematic account of the stable differences among learners — their readiness, abilities, interests, pace of work, and learning profiles — by grouping them or by varying the conditions of instruction accordingly. Two levels are traditionally distinguished. **External (macro-level) differentiation** operates through the structure of the education system itself: streams, profiles, specialized classes, optional courses. **Internal (micro-level) differentiation** operates within a single classroom, where one teacher works with a heterogeneous group and varies tasks, support, and expectations for different students.

The decisive feature of differentiation is its **status as a category and an objective regularity** rather than a method. It names a general state of affairs — the fact that the educational process can and should be internally varied in response to learner differences — and an organizational principle of the system as a whole. In this sense differentiation is the broadest of the three concepts: it answers the question "what is the general regularity?" and provides the theoretical frame within which the other two concepts acquire their meaning.

3.2. The differentiated approach as a methodological principle

An "approach" in the methodology of pedagogy is a category of a different order from differentiation. It is not an objective state of the educational system but a *regulative orientation* — a way of conceiving and designing pedagogical activity that determines which factors the teacher and the researcher treat as primary. A differentiated approach, accordingly, is the principled orientation of the educator toward the systematic consideration of learner differences in goal-setting, content selection, and the choice of methods and forms of work.

Conceptually, the differentiated approach occupies the **intermediate, methodological level** between the general category of differentiation and its concrete classroom realization. It translates the objective regularity expressed by differentiation into a normative requirement for professional action: "because learners differ in stable and educationally relevant ways, the teaching process must be deliberately adapted to those differences." In this respect the differentiated approach is closely connected with, but not identical to, the **individual approach**: the individual approach is oriented toward the unique features of a single learner, whereas the differentiated approach typically operates with typological groups of learners who share relevant characteristics.

The theoretical grounding of the approach is also distinctive. It rests on the recognition that learning is most productive when tasks are pitched within each learner's reachable range of development — a notion consonant with L. S. Vygotsky's idea of the zone of proximal development — and on the acknowledgement of the diversity of learners' cognitive profiles. As a principle, the differentiated approach answers the question "how should one think about and orient the design of teaching?" It is regulative and strategic rather than operational.

3.3. Differentiated instruction as a procedural-technological phenomenon

Differentiated instruction (DI) represents the third and most concrete level. It is the practical, procedural-technological realization of the differentiated approach in the immediate space of teaching and learning. Where the approach states a principle, differentiated instruction specifies the operations through which that principle becomes a lived classroom reality. In the most influential contemporary account, C. A. Tomlinson defines differentiated instruction as a teacher's proactive and systematic response to learner needs, in which the educator deliberately modifies the elements of instruction in accordance with what students are ready for, what interests them, and how they learn best.

Asian Journal of Technology and Applied Sciences
ISSN: 2301-xxxx (online) | IF: 10.01 | Vol: 1, issue 1
Available: http://asiansciencejournal.org

Within this framework, the teacher can differentiate four interrelated elements of the educational process: the **content** (what students learn and the materials through which they access it), the **process** (the activities through which students make sense of ideas), the **product** (the ways in which students demonstrate and extend what they have learned), and the **learning environment** (the climate and physical and procedural organization of the classroom). These modifications are made in response to three characteristics of the learner — **readiness**, **interest**, and **learning profile**.

Thus differentiated instruction is essentially **operational and technological**: it is the system of concrete strategies, techniques, and organizational decisions — tiered tasks, flexible grouping, choice boards, varied scaffolding, formative assessment used to adjust teaching — through which the differentiated approach is enacted. It answers the question "what, concretely, does the teacher do?" and it is at this level that the abstract regularity of differentiation finally reaches the individual learner.

3.4. The interrelation of the three concepts

The analysis shows that the three concepts are neither synonyms nor parallel alternatives, but elements of a single, vertically nested system distinguished by their scientific status and function. Differentiation is the **genus** — the general category and objective regularity. The differentiated approach is the **mediating methodological principle** that converts this regularity into a normative orientation for action. Differentiated instruction is the **species-level process and technology** through which the principle is realized in practice. The relationship is one of subordination and concretization: each subsequent level presupposes and operationalizes the preceding one.

The comparative parameters of the three concepts are summarized in Table 1.

Table 1. Comparative characteristics of the three concepts

Parameter	Differentiation	Differentiated approach	Differentiated instruction
Scientific status	General scientific and pedagogical category; objective regularity	Methodological principle; regulative, strategic orientation	Pedagogical process and technology; system of practical operations
Level	Theoretical – general (the broadest, genus concept)	Methodological – intermediate (mediating link)	Practical – operational (concrete realization)
Core function	Fixes the regularity of internal variation in education	Orients the design of teaching toward learner differences	Enacts the principle through concrete classroom strategies
Key question	What is the general regularity?	How should teaching be oriented?	What does the teacher concretely do?
Scope	Whole education system (external and internal	Professional activity of the educator	The immediate teaching–learning situation

Parameter	Differentiation	Differentiated approach	Differentiated instruction
	levels)		
Representative authors	I. Unt; E. S. Rabunsky; A. A. Kirsanov	Methodology of the differentiated / individual approach	C. A. Tomlinson; P. Subban; T. Hall et al.

Taken together, these parameters reveal a clear functional division of labour. The category provides the theoretical foundation and justification; the principle provides the methodological direction; the technology provides the means of implementation. Removing any level breaks the chain: a technology without a principle becomes a set of disconnected techniques, while a principle without a category loses its theoretical justification, and a category without realization remains a purely descriptive abstraction.

Discussion

The results allow the initial problem — the synonymous and therefore imprecise use of the three terms — to be reframed. Rather than competing definitions of a single phenomenon, the concepts represent three distinct but interdependent levels of one and the same reality: the adaptation of education to learner diversity, viewed respectively as a regularity, as a principle, and as a practice. This reading reconciles the apparent overlap noted in the literature with the intuition of many practitioners that the terms "belong together."

The proposed model also brings the two source traditions into productive correspondence. The post-Soviet literature on the individualization and differentiation of instruction concentrated heavily on the first two levels, elaborating differentiation as an organizational regularity and the differentiated (and individual) approach as a methodological requirement. The Western tradition of differentiated instruction, by contrast, gave its most detailed attention to the third level, supplying an elaborated technology of content, process, product, and environment keyed to readiness, interest, and learning profile. Read through the "category – principle – process" model, the two traditions are not rivals but complementary contributions to different strata of the same conceptual system.

For inclusive education the distinction is of direct practical value. Inclusion presupposes that learners with markedly different needs, including those with special educational needs, are taught together; differentiation as a category establishes the very possibility and necessity of internally varied teaching, the differentiated approach obliges the teacher to plan for that variation, and differentiated instruction supplies the concrete repertoire that makes participation and progress attainable for every learner. A clear separation of the levels therefore helps to specify *what* must be designed at the level of the system, *what* must be cultivated as a professional disposition, and *what* must be mastered as classroom technique — a useful structuring principle for the preparation of inclusive educators.

At the same time, the limitations of the study should be acknowledged. The work is theoretical: it clarifies and orders concepts but does not, by itself, test the model against empirical teaching practice. Its conclusions are therefore best regarded as a methodological foundation that requires subsequent empirical verification — for example, through analysis of how the three levels are actually realized in inclusive classrooms and how their differentiation influences the design and outcomes of teacher-preparation programmes.

Conclusion

The clarification of the categorical apparatus undertaken in this article shows that "differentiation," "differentiated approach," and "differentiated instruction" are not interchangeable synonyms but three hierarchically connected concepts. Differentiation is a general scientific and pedagogical category that fixes the objective regularity of internal variation in education; the differentiated approach is a methodological principle that orients professional activity toward learner differences; and differentiated instruction is the procedural-technological level at which this principle is realized through concrete classroom strategies.

Their relationship can be expressed as a single "category – principle – process" model, in which each level subordinates and concretizes the previous one. Recognizing this structure removes the terminological confusion that weakens many studies, integrates the post-Soviet and Western research traditions within one framework, and provides a precise conceptual basis for further investigation of how the adaptation of teaching to learner diversity can be designed and implemented, especially in the context of inclusive education.

REFERENCES

1. Gardner, H. (2011). Frames of mind: The theory of multiple intelligences (3rd ed.). New York: Basic Books.
2. Hall, T., Strangman, N., & Meyer, A. (2003). Differentiated instruction and implications for UDL implementation. Wakefield, MA: National Center on Accessing the General Curriculum.
3. Heacox, D. (2012). Differentiating instruction in the regular classroom: How to reach and teach all learners (Updated ed.). Minneapolis, MN: Free Spirit Publishing.
4. Roy, A., Guay, F., & Valois, P. (2013). Teaching to address diverse learning needs: Development and validation of a Differentiated Instruction Scale. International Journal of Inclusive Education, 17(11), 1186–1204.
5. Subban, P. (2006). Differentiated instruction: A research basis. International Education Journal, 7(7), 935–947.
6. Tomlinson, C. A. (2001). How to differentiate instruction in mixed-ability classrooms (2nd ed.). Alexandria, VA: ASCD.
7. Tomlinson, C. A. (2014). The differentiated classroom: Responding to the needs of all learners (2nd ed.). Alexandria, VA: ASCD.
8. Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimijoin, K., Conover, L. A., & Reynolds, T. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature. Journal for the Education of the Gifted, 27(2–3), 119–145.
9. UNESCO. (1994). The Salamanca statement and framework for action on special needs education. Paris: UNESCO.
10. Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.
11. Kirsanov, A. A. (1982). Individualizatsiya uchebnoy deyatel'nosti kak pedagogicheskaya problema [Individualization of learning activity as a pedagogical problem]. Kazan: Kazan University Press.
12. Rabunsky, E. S. (1975). Individual'nyy podkhod v protsesse obucheniya shkol'nikov [The individual approach in the process of teaching schoolchildren]. Moscow: Pedagogika.
13. Unt, I. E. (1990). Individualizatsiya i differentsiatsiya obucheniya [Individualization and differentiation of instruction]. Moscow: Pedagogika.