

BALANCE AND FLEXIBILITY IN CURRICULUM PLANNING: ANALYSIS OF PAULO TOMAZINHO'S MODEL AND ITS IMPLICATIONS FOR THE QUALITY OF EDUCATION

<https://doi.org/10.56238/sevened2024.029-042>

Luciana Carvalho dos Reis Fim¹, Mayons Pessin Zagoto², Márcia Schiavo³, Wagner Barbosa de Oliveira⁴ and Mara Rúbia Gusson Vittorazzi⁵

ABSTRACT

This article investigates the impact of curriculum planning on the quality of education, with a special focus on the model proposed by Paulo Tomazinho. The model emphasizes the need for an integrated and flexible approach in the process of curriculum construction, highlighting the relevance of planning, designing, developing, and evaluating pedagogical practices in a cohesive way. Tomazinho's proposal advocates close coordination between these phases, promoting an integration that allows the curriculum not only to meet the immediate demands of society, but also to form critical citizens who are prepared to face the challenges of the contemporary world. The main objective of this study is to analyze the applicability of the principles defended by Tomazinho in the current educational scenario, taking into account the importance of three fundamental elements: neutrality, flexibility and curricular autonomy. The research is in line with the principles established by the Law of Guidelines and Bases of Education (LDB), which seeks to ensure an education that promotes inclusion, respects diversity and fosters critical and autonomous thinking. In this sense, the reflection on curricular neutrality appears as a highlight point, since the curriculum can be influenced by ideological and social forces that directly impact the teaching-learning process. The methodology used in this article is based on a documentary analysis, associated with a critical review of the existing literature on Tomazinho's model and Brazilian educational legislation. Through this approach, the main theoretical and practical contributions of the curriculum planning model were examined, as well as its limitations and challenges. The results of the research indicate that curricular flexibility, although essential to meet the diversity of educational demands, must always be accompanied by a critical reflection on the external influences that shape the curriculum. It is thus concluded that the balance between structure and flexibility is fundamental to promote quality education, capable of forming critical individuals, aware of their role in society and prepared to act in an autonomous and transformative way.

Keywords: Curriculum Planning. Flexibility. Quality of Education. Teacher Autonomy. Curricular Neutrality. Law of Guidelines and Bases.

¹ Doctoral student in Educational Sciences at the Facultad Interamericana de Ciencias Sociales (FICS)
E-mail Luciana.prof94@gmail.com

² Doctoral student in Educational Sciences at the Facultad Interamericana de Ciencias Sociales (FICS)
E-mail m.zagoto28@gmail.com

³ Doctoral student in Educational Sciences at the Inter-American Faculty of Sciences (FICS)
E-mail marcia_schia@hotmail.com

⁴ Doctoral student in Educational Sciences at the Facultad Interamericana de Ciencias Sociales (FICS)
E-mail wagnercastelo3@gmail.com

⁵ Doctoral student in Educational Sciences at the Inter-American Faculty of Sciences (FICS)
E-mail mararubia_vettorazzi@hotmail.com



INTRODUCTION

Curriculum planning is an essential component in defining the quality and effectiveness of the educational process. It serves as the foundation on which teaching practices are built, directly influencing student learning and the achievement of educational objectives. Without proper planning, the teaching process can become fragmented and ineffective, compromising the development of competencies and skills necessary for students' academic and personal success.

In this context, curriculum planning acquires strategic importance, as it directs and organizes the contents, methods and assessments that make up the educational experience.

Paulo Tomazinho's proposal on curriculum planning represents an innovative approach that seeks to harmonize structure and flexibility, responding to the dynamic demands of the contemporary educational scenario. The innovation in Tomazinho's approach lies in the way he proposes a balance between the need for a solid structure — which ensures the continuity and cohesion of teaching — and the flexibility necessary for the curriculum to adapt to social and technological transformations. In this way, his proposal meets a fundamental principle of modern education: the formation of critical, creative individuals prepared to deal with a world in constant change.

Tomazinho argues that a well-planned curriculum must integrate in a coordinated manner the aspects of planning, design, development and evaluation. He argues that to be truly effective, the curriculum must be designed not only to meet current needs, but also to adapt to future changes. This view broadens the traditional perspective of curriculum planning, which is often limited to an exclusive focus on immediate demands. On the contrary, Tomazinho suggests that the curriculum should be a living instrument, in constant review and adaptation, reflecting both contemporary needs and forecasts for the future.

The current educational landscape is immersed in rapid and profound changes, driven by globalization and the accelerated advancement of digital technologies. These factors have reshaped not only what is taught, but also how teaching is carried out. Demands for new competencies, such as digital skills and critical thinking, become increasingly urgent. In this sense, rigid and inflexible curricula can quickly become obsolete, unable to prepare students for the challenges of the twenty-first century.

Thus, the need for flexible and adaptable curricula becomes more evident. However, curricular flexibility must be carefully balanced with the need to maintain a cohesive and consistent structure, which ensures the integrity and continuity of educational training. The



lack of a solid structure can result in a dispersed educational experience, harming the education of students.

The curriculum planning model proposed by Tomazinho seeks precisely this balance. He suggests a curriculum that not only adapts to external changes, but also maintains a solid structure that guides and organizes the teaching-learning process. Tomazinho believes that by integrating flexibility with structure, it is possible to create a curriculum that is both responsive and consistent, ensuring that students receive a high-quality education that prepares them for the future.

In addition, he argues that this integration must be continuous, that is, the curriculum must be reviewed and updated regularly to keep up with the evolution of society and the needs of students.

The Law of Guidelines and Bases of Education (LDB), established by Law No. 9,394/1996, offers an essential legal framework for the preparation and execution of curricula in Brazilian educational institutions. The LDB emphasizes the importance of the autonomy of schools and educators in the construction of pedagogical proposals, allowing adaptations that reflect local realities and the needs of students. This aspect of LDB is critical to ensuring that curricula are relevant and meaningful, since they can be adjusted to meet the specific demands of different social, economic, and cultural contexts.

However, the practical application of these principles faces significant challenges. Schools and educators often struggle to balance pedagogical autonomy with normative demands and pressures to maintain curricular cohesion. Lack of resources and pressure for immediate results can also make it difficult to implement flexible and innovative curricula, leading to the perpetuation of traditional models that may not meet the contemporary needs of students.

In this context, Tomazinho's proposal offers a valuable perspective on how to overcome these challenges. Its model provides guidelines for implementing curriculum planning that is both flexible and structured, aligning with LDB guidelines and promoting quality education. Tomazinho's approach can serve as a guide for educational institutions in adapting their curricula, helping them to face contemporary demands effectively.

This study aims to evaluate the application of Paulo Tomazinho's curriculum planning model in the current educational context, investigating how its guidelines can be implemented in a practical and effective way. The analysis will seek to understand how Tomazinho's model aligns with the LDB guidelines and how it can contribute to the improvement of educational quality. Through this evaluation, the article aims to offer insights



into the feasibility and effectiveness of Tomazinho's model, as well as its implications for pedagogical practice and educational policymaking.

DEVELOPMENT

POSITIONING

The curriculum planning model proposed by Paulo Tomazinho emphasizes the importance of a flexible and integrated approach, which covers all phases of curriculum development: planning, design, development and evaluation. Tomazinho argues that the curriculum should be designed to respond not only to dynamic changes in society, but also to the emerging needs of students, recognizing the importance of maintaining the relevance and constant updating of educational content.

This flexible approach allows the curriculum to adapt to the specificities of local contexts and technological innovations. Tomazinho argues that curricular flexibility should be a central component of the curriculum, allowing adjustments that consider local characteristics, changes in social conditions, and technological advances. This entails constantly reviewing and updating the curriculum to ensure that it remains aligned with the needs and expectations of students and society.

The Law of Guidelines and Bases of Education (LDB), in its article 12, provides the legal basis for educational institutions to adapt their pedagogical proposals to the needs of students and the community. This article is fundamental for the implementation of Tomazinho's vision, as it ensures that schools have the necessary autonomy to elaborate and execute their pedagogical proposals according to their specific realities. The LDB establishes that:

Article 12. Educational establishments, respecting the common norms and those of their education system, shall be responsible for: I - preparing and executing their pedagogical proposal; II - to manage its personnel and its material and financial resources; III - to ensure compliance with the established school days and class hours; IV - to ensure compliance with the work plan of each teacher; V - to provide means for the recovery of students with lower performance; (BRAZIL, 1996)

This excerpt reinforces the autonomy of institutions and educators in the elaboration of curricula, which is in line with Tomazinho's vision. However, autonomy must be exercised responsibly, to ensure that curricular flexibility does not compromise educational cohesion and quality. It is essential that when adapting the curriculum, institutions maintain high standards and ensure that all changes contribute to quality education. However, there are challenges to curricular flexibility.



CHALLENGES OF CURRICULAR FLEXIBILITY

While curricular flexibility is an essential concept for adapting the curriculum to contemporary needs, it faces significant challenges. Silva (1999) describes the curriculum as a "territory of power", where legitimate knowledge is defined and often excludes important knowledge. The conception of curriculum as a space for disputes and negotiations reveals that what is considered legitimate knowledge is not a neutral choice, but a reflection of social hierarchies and dominant interests.

Silva argues that the curriculum should not be seen only as a neutral selection of content, but as an arena where identities and differences are constructed, validated, or excluded. The curriculum, therefore, is a territory of power that reflects and reproduces social hierarchies, legitimizing certain knowledge and marginalizing others. This implies that when implementing curricular flexibility, it is critical to consider which knowledges are included and which are excluded, and to understand the interests that shape these decisions.

"The curriculum cannot be understood simply as a neutral selection of content, but as an arena of disputes, a space where identities and differences are constructed, validated, or excluded. It is a territory of power, in which certain knowledges are legitimized and others marginalized, reflecting and reproducing social hierarchies." (SILVA, 1999, p. 15)

For Silva, curricular flexibility must be implemented with a critical analysis of the knowledge and ideologies that influence the curriculum. This requires educators to be attentive to the issues of inclusion and exclusion of knowledge, ensuring that the adaptation of the curriculum does not perpetuate existing inequalities.

Michael Apple (1979) contributes to this discussion by highlighting that the curriculum often reflects the interests of dominant social groups, functioning as a means of reinforcing established ideologies and perpetuating social inequalities. Apple argues that the curriculum shapes the knowledge imparted and the forms of teaching in a way that maintains existing power structures and legitimizes social inequalities:

The curriculum often reflects the interests of dominant social groups, functioning as a means of reinforcing established ideologies and perpetuating inequalities. By shaping the knowledge transmitted and the forms of teaching, the curriculum contributes to the maintenance of existing power structures and to the legitimization of social inequalities. (APPLE, 1979, p. 36)

In this sense, José Augusto Pacheco (2001) also emphasizes the need for a curriculum that responds to contemporary challenges, allowing different contexts and social realities to be taken into account in the educational process.



Therefore, curricular flexibility should not be used to promote ideological views that do not contribute to equitable education. The LDB, with its emphasis on pluralism of ideas and respect for diversity, offers a guide to ensure that the curriculum reflects a wide range of perspectives and expertise. The implementation of curricular flexibility must be done with a commitment to social justice and educational equity, always weaving curricular neutrality and aware of dominant ideologies.

CURRICULAR NEUTRALITY AND IDEOLOGY

The issue of curricular neutrality is central to the discussion on flexibility. Tomazinho argues that the curriculum should be a space where different perspectives can be explored critically, without ideological impositions.

Maurice Tardif (2000), when dealing with teaching knowledge, reinforces that teachers need to be aware of the ideological influences present in the curriculum so that they can adapt it to the real needs of students, without perpetuating inequalities. Teacher autonomy, highlighted by both Tomazinho and the LDB, allows teachers to be the main mediators between the planned curriculum and the reality of the classroom.

The issue of curricular neutrality is at the heart of the discussion on flexibility. Paulo Freire (2011) argues that education should be a space for dialogue and critical reflection, where different perspectives can be explored without ideological impositions.

However, Terry Eagleton (2006) criticizes the idea of neutrality, arguing that it often hides the reproduction of dominant values. Neutrality, therefore, should be understood as a space for dialogue and critical reflection, rather than an imposition of a single vision:

"The claim of cultural neutrality, however, often serves to mask the imposition of certain dominant values. Far from being an absence of values, neutrality, on several occasions, acts as a disguise for the continuity of hegemonic ideologies. It is precisely this alleged impartiality that allows the perpetuation of power structures."
(EAGLETON, 2006, p. 46)

Eagleton's (2006) considerations emphasize that to ensure that the curriculum is truly neutral and inclusive, it is necessary to represent and discuss different perspectives. This requires constant vigilance over ideological influences and a critical approach when selecting curriculum content. The autonomy of educators, as highlighted by the LDB, is essential for them to be able to adapt the curriculum according to the needs of the students, maintaining the integrity and equity of the educational process.

The autonomy of educators is a fundamental principle in the LDB and is fundamental for the implementation of the curriculum proposed by Tomazinho. The LDB recognizes the importance of pedagogical autonomy, allowing schools to develop their curricular proposals



in collaboration with teachers, respecting national guidelines. Tomazinho states that the teacher is the main mediator between the planned curriculum and the reality of the classroom, and his autonomy is vital to adapt teaching to the needs of students:

"The teacher is the main mediator between the planned curriculum and the reality of the classroom. Their autonomy is vital to adapt teaching to the needs of students."
(TOMAZINHO, 2024, p. 29)

The autonomy of educators must be exercised with a critical understanding of the challenges and ideological pressures that can influence education. Saviani (1983) argues that the school plays a contradictory role in reproducing and transforming social inequalities:

"The school, at the same time that it reproduces social inequalities, is also the space where these inequalities can be transformed. It thus performs a contradictory function: it perpetuates the conditions of domination by reproducing existing social relations, but it also contains the potential to overcome these same conditions, opening up possibilities for social emancipation." (SAVIANI, 1983, p. 82)

The author confirms that the autonomy of educators allows them to adapt the curriculum to promote an inclusive and emancipatory education, but it must be balanced with a critical analysis of the external influences that can affect the educational process.

Denise Leite (2003) also warns of the importance of recognizing the political and ideological implications of curricular decisions. Neutrality, if understood as the absence of values, can perpetuate invisible power structures, while a critical approach to neutrality can promote a more just and equitable education.

Educators must be aware of the complexities and challenges involved in implementing the curriculum to ensure that it contributes to social justice and equity in education, so it is relevant to implement critical and reflective practices in this context.

PRACTICAL AND REFLECTIVE IMPLEMENTATION

To implement Tomazinho's model effectively, educators and managers must take a reflective and critical approach. This involves continually analyzing the ideological and social influences that may impact the curriculum and ensuring that adaptations are made in a way that promotes equity and inclusion. The LDB guides the democratic management of public education, including the valorization of teacher autonomy, which must be integrated into pedagogical practice to ensure quality education.

The practical implementation of the curriculum must consider local and contextual needs, allowing the contents to be adapted according to the realities of the students. As



established by the LDB (Law of Guidelines and Bases of National Education) addresses the issue of curricular flexibility and adaptation in article 12:

The educational establishments, respecting the common norms and those of their education system, will be responsible for preparing and executing their pedagogical proposal; manage its personnel and its material and financial resources; ensure compliance with the established school days and class hours; ensure compliance with the work plan of each teacher; to provide means for the recovery of students with lower performance; and articulate with families and the community, creating processes of integration of society with the school (Brasil, 1996).

This requires effective collaboration between educators, administrators, and the school community to ensure that the curriculum is relevant and meaningful to everyone involved. Implementation should involve an ongoing process of review and adjustment, ensuring that the curriculum remains up-to-date and tailored to the needs of students.

In addition, it is important for educators to actively participate in the construction and adaptation of the curriculum, ensuring that their voices and experiences are heard. Collaboration between different stakeholders can enrich the curriculum development process and ensure that the curriculum reflects the diversity of perspectives and needs of the school community. However, there are still questions to be answered.

QUESTIONING

The question of how to ensure that a flexible curriculum maintains its neutrality and promotes critical education is fundamental. To answer this question, a continuous examination of the role of the curriculum in society and the ideological pressures that can influence teaching is necessary.

The contributions of Tomás Tadeu Silva and Michael Apple highlight the importance of constant vigilance over the influences that shape the curriculum and the need to promote an education that values the diversity of thought and knowledge.

Morin (2000) suggests that the balance between structure and flexibility should be achieved through complex thinking, which allows the integration of diverse knowledge and the contextualization of knowledge in the curriculum:

The balance between structure and flexibility in the curriculum must be achieved through complex thinking, which enables the integration of diverse knowledge and the contextualization of knowledge. Such an approach not only allows for a more holistic understanding of educational realities, but also promotes an education that reflects the complexity and interconnectedness of social and cultural phenomena. (MORIN, 2000, p. 43)

This approach is in line with the LDB guidelines for the formation of a critical and reflective citizen, capable of understanding and responding to the complexities of the



contemporary world. The implementation of the curriculum should therefore be done with a critical and reflective approach, ensuring that teaching is relevant, inclusive, and able to promote a deep and comprehensive understanding of the social and cultural issues faced by students.

This complex thinking is necessary for the curriculum to remain dynamic and adaptable, without losing sight of the fundamental principles of an inclusive and emancipatory education. Ivor Goodson (2007) emphasizes that the curriculum must be constantly reviewed and adjusted to reflect social and technological changes, without distancing itself from its pedagogical objectives.

Ultimately, curricular flexibility must be implemented with a commitment to social justice and equity, ensuring that curriculum adaptations promote education that meets the needs of students, without immolating the quality and cohesion of the educational process.

CONCLUSION

The analysis of the curriculum planning model proposed by Paulo Tomazinho reveals the complexity and importance of balancing structure and flexibility to ensure a high-quality education. Tomazinho's model offers an approach that values both the organization and continuity of the curriculum and the ability to adapt to social and technological changes. This duality is categorical in an ever-evolving educational context, where the need for innovation and adaptation must be harmonized with the maintenance of a solid and coherent foundation.

The concept of flexibility in the curriculum allows it to adjust to different social realities and demands, without losing sight of the essential objectives of education. This progressive view recognizes that while knowledge and skills are universal in many ways, the way they are imparted must take into account the regional and cultural specificities of students. However, this flexibility must always be managed with caution so as not to weaken the coherence and consistency of the educational process. Tomazinho argues that the key to successful implementation is the balance between innovation and tradition, allowing the curriculum to evolve without losing its essence.

The Law of Guidelines and Bases of Education (LDB) offers the necessary legal support for the curriculum to be molded to the specific needs of students, without abandoning the fundamental principles of education. It guarantees educators the autonomy to adapt the curriculum to the needs of the school community, while promoting guidelines that ensure the quality and equity of teaching. However, the implementation of this flexibility faces practical challenges, especially with regard to curricular neutrality, resistance to



change, and ideological pressures that can influence both educational processes and curriculum formulation itself. Therefore, constant care is needed to prevent flexibility from becoming synonymous with incoherence or loss of quality in education.

The results obtained in this research offer significant contributions to both society and academia. For society, the investigation reinforces the importance of curricula that, in addition to keeping up with the pace of contemporary changes, promote a critical, inclusive education that prepares students for the complexity of today's world. In an ever-changing global landscape, education needs to train citizens who have not only knowledge, but also skills to think critically, solve problems, and adapt to new realities. This type of training not only enriches the individual, but also strengthens society as a whole, preparing active citizens committed to the common good.

For academia, this study provides important reflections on the application of Tomazinho's model in curriculum planning, reinforcing the need for an approach that balances tradition and innovation. The research contributes to the development of curricular theories that are both pragmatic and reflective, capable of dealing with technological and social changes, without losing sight of the essential educational objectives. The implementation of curricula that are both flexible and consistent with educational principles is one of the biggest challenges faced by educational institutions, and Tomazinho's model stands as an important reference in this process.

However, it is important to note that research has its limitations. The analysis was mainly focused on Tomazinho's model and, although it offers valuable guidelines, it may not fully reflect the different educational realities present in different regions and education systems. The diversity of cultural and educational contexts demands that the model be adapted and reconfigured according to local needs, which was not always explored in sufficient depth in this study. In addition, the study did not delve sufficiently into external influences, such as power dynamics and ideological pressures that can compromise the neutrality and equity of the curriculum. These external, often invisible forces play a crucial role in how the curriculum is interpreted and implemented in schools and need to be considered in future investigations.

Therefore, future research can explore in more detail how Tomazinho's model can be adjusted and applied to different educational realities, taking into account regional and cultural specificities. In addition, it would be of great value to investigate more deeply the external influences acting on the curriculum, especially with regard to ideological pressures and power dynamics, in order to ensure that curricular flexibility does not compromise its



quality and equity. Understanding how these forces shape curricular practice can contribute to building a more robust and equitable education system.

In short, Tomazinho's model offers an innovative and valuable approach to curriculum planning, suggesting a path for curricula that can effectively balance structure and flexibility. By aligning theory and practice, the model opens up possibilities for educational institutions to not only adapt to contemporary transformations, but also promote critical, inclusive, and transformative education. This balance between innovation and tradition is crucial to prepare students who are not only recipients of knowledge, but also active, critical citizens prepared for the challenges of a constantly evolving world.

Finally, it is essential to recognize that the success of the educational process depends on the ability to continuously review and update curricula, while maintaining a critical and inclusive approach. The commitment to the quality and relevance of education must be permanent, in order to form citizens capable of facing the changes of the modern world. Future works that deepen these discussions will certainly contribute to an education that is increasingly aligned with the needs of contemporary society.

Therefore, the key to achieving quality education lies in the ability to adapt the curriculum in a reflective and informed way, ensuring that it remains relevant and effective in the current educational context. The constant review and updating of curricula, combined with a critical and inclusive approach, is essential for the formation of citizens capable of facing the challenges and taking advantage of the opportunities of the modern world.

ACKNOWLEDGMENTS

This work is the result of a collective effort that would not have been possible without the support and dedication of several people. First, we express our deep gratitude to our family members, who offered us unconditional support during the research and writing process. The patience and understanding of each of them were essential for us to be able to dedicate the necessary time to the preparation of this article, and without their encouragement, this journey would have been even more challenging.

We especially thank our educational institution FICS and our doctoral classmates, who provided us with an environment conducive to debate and the maturation of the ideas presented. The discussions held in our academic meetings were decisive for us to refine our critical thinking and explore in more depth the curriculum planning model proposed by Paulo Tomazinho.

In addition, we want to express our sincere recognition to Professor Dr. Paulo Tomazinho himself, whose work was the central inspiration of this study. His contributions to the field of



education, particularly with regard to flexibility and balance in curriculum planning, were extremely important for the development of this article. The analysis of his model allowed us to reflect on the practical implications of his ideas on the quality of education and to expand our understanding of the topic.

We are also grateful to the reviewers and editors of this publication, who, with their thoughtful observations and constructive suggestions, helped to enhance this work and ensure that the content was presented clearly and accurately. Your contributions were valuable in raising the academic level of this article.

Finally, we want to register our gratitude to all those who, directly or indirectly, collaborated in the realization of this study. Whether through conversations, critical readings or technical support, each contribution was essential for us to be able to complete this research with the desired depth and quality.



REFERENCES

1. APPLE, M. W. (1979). *Ideology and curriculum*. São Paulo: Brasiliense.
2. BRAZIL. (1996). Law No. 9,394, of December 20, 1996. It establishes the guidelines and bases of national education. *Diário Oficial da União*, Brasília, DF, 23 Dec.
3. BRAZIL. (2000). *Curricular parameters of high school*. Brasília: MEC.
4. BRAZIL. (2006). *National curriculum parameters: High school*. Ministry of Education, Secretariat of Medium Education and Technology. MEC; SEMTEC.
5. EAGLETON, T. (2006). *Theory of literature: An introduction* (W. Dutra, Trans.; 2nd ed.). São Paulo: Martins Fontes.
6. GOODSON, I. (2007). *Curriculum: Theory and history* (3rd ed.). Petrópolis: Vozes.
7. LEITE, D. (2003). *Curriculum: Policy and practices*. Porto Alegre: EDIPUCRS.
8. LÜDKE, M., & ANDRÉ, M. E. D. A. (1986). *Research in education: Qualitative approaches* (2nd ed.). São Paulo: EPU.
9. MORIN, E. (2000). *The seven knowledges necessary for the education of the future*. São Paulo: Cortez.
10. PACHECO, J. A. (2001). *Curricular studies*. Porto: Porto Editora.
11. SAVIANI, D. (1983). *School and democracy*. Campinas: Associated Authors.
12. SILVA, T. T. da. (1999). *Identity documents: Introduction to curriculum theories*. Belo Horizonte: Autêntica.
13. TARDIF, M. (2000). *Teaching knowledge and professional training*. Petrópolis: Vozes.
14. TOMAZINHO, P. (2024). *Curriculum: Planning, design, development and curriculum evaluation*. São Paulo: Educators.
15. TOMAZINHO, P. (2010). *Curriculum planning: Fundamentals and practice*. Curitiba: Ibpex.