How to Cite:

Lua, D. T., & Hoi, V. T. (2025). Management of professional communication skill training for primary school teachers in Duong Kinh District, Hai Phong City: Towards a happy school. *Macrolinguistics and Microlinguistics*, *6*(1), 18–31. https://doi.org/10.21744/mami.v6n1.33

Management of Professional Communication Skill Training for Primary School Teachers in Duong Kinh District, Hai Phong City: Towards a Happy School

Dinh Thi Lua

Standing Deputy Secretary of Ha Nam Province, Vietnam

Vu Thi Hoi

Graduate students of VNU University of Education, Vietnam

Abstract---This study investigates the management of professional communication skill training for primary school teachers in Duong Kinh District, Hai Phong City, with the aim of fostering a happier school environment. Utilizing a mixed-methods approach, the research combines quantitative data from structured questionnaires and qualitative insights from interviews and focus groups. The results show that 78% of participants attend communication skill training at least annually, but only 45% of teachers engage in these sessions more frequently, indicating a gap in training regularity. The effectiveness of the training programs varies, with principals and subject heads generally reporting higher effectiveness compared to teachers. Although 72% of respondents recognize a positive impact on the school environment, including improved classroom management and staff relations, 20% find the training to be of limited relevance or impact. Qualitative findings reveal challenges such as limited resources, insufficient time for training, and inconsistent staff commitment. The study identifies the need for more interactive and context-specific training to address these issues. Recommendations for

^{© 2025} by The Author(s). (cc) BY

This journal is licensed under a Creative Commons Attribution 4.0 International License.

improving training effectiveness include increasing awareness of the importance of communication skills, enhancing needs assessments, setting specific and relevant training goals, improving content and delivery methods, and creating supportive working conditions. These measures aim to address the identified gaps and enhance the overall impact of communication skill training, contributing to a more positive and effective educational environment in Duong Kinh District.

Keywords—Communication Skill Training, Primary School Teachers, Educational Management, Happy School Environment, Duong Kinh District.

1. Introduction

In recent years, the concept of creating a "happy school" has gained significant attention in educational reform efforts worldwide. A happy school environment is characterized by a positive atmosphere where students feel safe, supported, and motivated to learn (King & Datu, 2017). This environment not only enhances students' overall well-being but also contributes to improved academic performance and teacher satisfaction (Hargreaves & Fullan, 2015).

One critical component in achieving such an environment is the effective communication between educators and their students. Professional communication skills are essential for teachers to manage classrooms, engage students, and foster a positive learning environment. Effective communication can lead to better student-teacher relationships, higher levels of student engagement, and a more harmonious school atmosphere (Cornett, 2017).

In Duong Kinh District, Hai Phong City, the quality of primary education has become a focal point for educational authorities. Recent initiatives aim to enhance the skills of primary school teachers, particularly in the area of professional communication, as a means to build a happier and more productive school environment (Nguyen & Pham, 2020). Despite these efforts, challenges persist in the implementation and management of communication skill training programs.

This study explores the management of professional communication skill training for primary school teachers in Duong Kinh District, focusing on strategies to align these efforts with the broader goal of establishing a happy school environment (Soleimani & Tebyanian, 2011). By examining current practices, identifying obstacles, and proposing solutions, this research aims to provide actionable recommendations for improving both the effectiveness of training programs and the overall quality of the educational experience (Heaven et al., 2006; Berkhof et al., 2011).

2. Theoretical Framework

2.1. Concept of Professional Communication

Professional Communication is a critical aspect of effective teaching and organizational interaction in educational settings. It involves the exchange of information in a manner that is clear, respectful, and purposeful. This concept encompasses various forms of communication, including verbal, non-verbal, and written, each playing a unique role in fostering effective interactions within the school environment (Martins et al., 2019; Dobre, 2015).

Verbal Communication is foundational in educational contexts. It includes spoken interactions such as lectures, instructions, and discussions. Effective verbal communication is crucial for delivering clear and understandable instructions, managing classroom activities, and engaging students in meaningful dialogue. As Brownell (2015) highlights, clear verbal communication enables teachers to present complex information in an accessible way, which enhances students' comprehension and engagement. Teachers who use precise language and an appropriate tone are better equipped to facilitate learning and manage classroom dynamics effectively.

Non-verbal Communication complements verbal interactions by providing additional context and emotional nuance. This form of communication includes body language, facial expressions, and gestures. Non-verbal cues can significantly impact how messages are received and interpreted by students. For instance, maintaining eye contact and using positive body language can help convey enthusiasm and support, which can improve student engagement and classroom atmosphere (Ekman & Friesen, 1975). Non-verbal communication often reinforces or contradicts verbal messages, making it essential for teachers to be mindful of their non-verbal cues in their interactions with students.

Written Communication is another vital component of professional communication in education. It involves the creation and dissemination of documents such as lesson plans, emails, reports, and feedback. Effective written communication ensures that important information is clearly conveyed and easily accessible. Guffey & Loewy (2013), emphasize that clear and concise written communication helps prevent misunderstandings and provides a permanent record of interactions and instructions. Teachers rely on written communication to document student progress, communicate with parents, and collaborate with colleagues.

The significance of professional communication in education extends beyond these individual components. Facilitating Learning is one of its primary roles. Effective communication supports the learning process by ensuring that instructional content is delivered in a way that is clear and engaging. Teachers who communicate effectively are able to present information in a manner that enhances student understanding and

retention (Cornett, 2017). This, in turn, contributes to improved academic outcomes and a more productive learning environment.

In addition, professional communication plays a crucial role in Managing Classroom Dynamics. Effective communication skills enable teachers to establish classroom rules, manage student behavior, and address any disruptions that arise. As Brophy (2006) notes, clear communication helps in setting expectations and maintaining a structured learning environment, which is essential for effective classroom management.

Moreover, professional communication is vital for Engaging Students. Teachers who employ engaging communication techniques—such as interactive questioning and personalized feedback—can significantly enhance student motivation and participation. Fredricks et al. (2004), suggest that engaging communication strategies are key to capturing students' interest and encouraging active involvement in the learning process.

Building strong Professional Relationships is another critical aspect of professional communication. Effective communication fosters trust and collaboration between teachers, students, parents, and colleagues. Pianta (1999), argues that positive relationships are fundamental for creating a supportive and inclusive school environment. Strong communication skills help build rapport and facilitate effective collaboration within the school community.

Lastly, professional communication supports Professional Development. Ongoing feedback, reflective discussions, and collaborative planning are all aspects of professional communication that contribute to teachers' growth and adaptation to new teaching practices. Guskey (2002) emphasizes that constructive communication is essential for continuous professional development and improvement in teaching practices.

Despite its importance, professional communication in education faces challenges, such as miscommunication and cultural differences. Teachers must navigate these challenges to ensure effective communication and positive interactions within the diverse school environment. Huang & Zhou (2017), highlight that the increasing use of digital communication tools also introduces new dynamics, requiring careful management to ensure clarity and appropriateness in messaging.

2.2. Role of Professional Communication

Professional communication plays a pivotal role in the educational environment, influencing various aspects of teaching, learning, and interpersonal interactions within schools. This role encompasses several critical functions, including enhancing

instructional effectiveness, managing classroom dynamics, engaging students, resolving conflicts, and supporting professional development. Each of these functions underscores the importance of clear, respectful, and purposeful communication in creating a positive and productive educational experience.

One of the primary roles of professional communication is enhancing instructional effectiveness. Effective communication is essential for the clear delivery of instructional content and for ensuring that students understand and engage with the material. According to Cornett (2017), teachers who communicate effectively can present complex concepts in a manner that is accessible and comprehensible to students, thereby improving their learning outcomes. Clear instructions, well-articulated explanations, and constructive feedback help students grasp academic content and apply it effectively, leading to better educational achievements.

Another crucial role of professional communication is managing classroom dynamics. Classroom management involves establishing rules, setting expectations, and addressing behavioral issues in a way that maintains a conducive learning environment. Brophy (2006) highlights that effective communication skills enable teachers to articulate expectations clearly, manage disruptions, and maintain a structured classroom environment. By using clear and consistent communication, teachers can prevent misunderstandings and ensure that students are aware of and adhere to classroom norms, thereby fostering a productive learning atmosphere.

Engaging students is also a significant aspect of the role of professional communication. Engaging communication techniques, such as interactive questioning and feedback, are vital for maintaining student interest and participation. Fredricks et al. (2004), emphasize that teachers who use engaging communication strategies can capture students' attention and motivate them to actively participate in learning activities. Engaging communication not only enhances students' involvement in the learning process but also contributes to a positive and dynamic classroom environment where students are enthusiastic about their educational experiences.

Conflicts resolution is another critical role of professional communication in education. Conflicts can arise between students, between teachers, or between students and teachers, and effective communication is essential for addressing and resolving these issues. Ekman & Friesen (1975) argue that skilled communicators are better equipped to understand different perspectives, mediate disputes, and find amicable solutions. By employing active listening, empathy, and clear expression, teachers can address conflicts constructively and maintain a harmonious classroom environment.

In addition to these roles, professional communication supports professional development. Ongoing professional growth requires regular feedback, reflective discussions, and collaborative planning. Guskey (2002), notes that effective

communication is crucial for facilitating professional development by providing teachers with constructive feedback, enabling reflective practices, and fostering collaboration among colleagues. Through open and constructive communication, educators can continuously improve their teaching practices, adapt to new educational strategies, and enhance their professional skills.

Moreover, professional communication plays a vital role in building positive relationships within the school community. Strong relationships between teachers, students, parents, and colleagues are fundamental for creating a supportive and collaborative school environment. Pianta (1999) asserts that positive relationships are built on effective communication, which fosters trust, respect, and cooperation. Teachers who communicate well with students and parents can build strong partnerships that support student learning and well-being.

Despite its importance, professional communication in education faces challenges such as miscommunication, cultural differences, and varying communication styles. Teachers must navigate these challenges to ensure effective communication and foster a positive educational environment. Huang & Zhou (2017), highlight that the increasing use of digital communication tools introduces new dynamics that require careful management to ensure that messages are clear and appropriately conveyed.

2.3. Happy School

The concept of a "happy school" has gained prominence as educators and researchers increasingly recognize the significance of a positive and supportive school environment for enhancing student well-being and academic success. A happy school is characterized by an atmosphere where students, teachers, and staff feel valued, safe, and motivated. This environment not only fosters academic achievement but also promotes emotional and social development, creating a holistic educational experience.

A happy school is fundamentally defined by its positive atmosphere. This involves creating a welcoming and supportive environment where individuals feel secure and respected. According to Hargreaves & Fullan (2015), a positive school climate is crucial for student and staff satisfaction, as it helps in reducing stress and anxiety, which can significantly impact overall well-being and academic performance. Schools that emphasize a positive atmosphere often implement practices that ensure physical safety, emotional support, and an inclusive culture.

Central to the idea of a happy school is the student-centered approach. This approach focuses on addressing the diverse needs and interests of students, promoting engagement, and ensuring that each student feels a sense of belonging. A student-centered school environment involves tailoring teaching methods to accommodate

different learning styles and needs, thereby enhancing student participation and motivation (Fredricks et al., 2004). By focusing on students' individual needs and interests, schools can foster a more engaging and supportive learning experience.

The supportive relationships within a happy school are another key characteristic. Strong, positive relationships between students, teachers, parents, and the broader school community contribute to a nurturing educational environment. Pianta (1999), emphasizes that these relationships are built on trust, respect, and effective communication. When students and staff experience strong interpersonal connections, they are more likely to feel supported and motivated, which contributes to a positive school culture and improved academic outcomes.

Emotional support is also a crucial element of a happy school. Providing adequate emotional and psychological support helps students and staff manage stress and maintain a positive outlook. Hargreaves & Fullan (2015), argue that emotional support is essential for fostering resilience and well-being, which in turn impacts students' ability to engage in learning and teachers' job satisfaction. Schools that prioritize emotional support often have counseling services, mental health resources, and programs designed to address emotional and psychological needs.

The curriculum in a happy school is designed to be both engaging and relevant to students' lives. An engaging curriculum stimulates students' interest and fosters a love for learning. Fredricks et al. (2004), highlight that an engaging curriculum is crucial for maintaining student motivation and involvement. Schools that implement a curriculum that connects with students' interests and real-life experiences are more likely to foster a positive and enthusiastic learning environment.

Furthermore, a happy school emphasizes positive reinforcement and celebration of achievements. Recognizing and celebrating successes, whether academic or personal, contributes to a positive school climate and boosts morale. According to Cornett (2017), positive reinforcement helps to build students' confidence and motivation, creating a supportive atmosphere where students feel encouraged to achieve their best.

Finally, a happy school fosters a collaborative environment where all members of the school community work together towards common goals. Collaboration among teachers, students, parents, and the community enhances the overall educational experience and supports student success. Brophy (2006), notes that a collaborative environment encourages mutual support and shared responsibility, which contributes to a more cohesive and effective school community.

3. Research Methodology

Research Design

This study employs a mixed-methods approach, integrating both quantitative and qualitative research methodologies to assess the management of professional communication skill training for primary school teachers in Duong Kinh District, Hai Phong City. The approach includes a comprehensive survey to gather broad, quantifiable data from a large sample, complemented by qualitative insights obtained through interviews to explore deeper aspects of the training programs and their impact (Alalwan et al., 2020).

Subjects and Data Sources

The research targets a total of 164 participants across various roles within the primary education sector in Duong Kinh District. The subjects are categorized as follows:

- 6 Principals of primary schools
- 10 Vice Principals
- 18 Subject Heads
- 3 Management Staff from the Department of Education and Training of the district
- 3 Management Staff from the Department of Education and Training of Hai Phong City
- 124 Primary School Teachers are currently employed in the primary schools within the district.

Data collection is conducted across 6 primary schools selected from the district to provide a representative overview of current practices and challenges related to communication skill training.

Data Collection Tools and Techniques

Questionnaires: Structured questionnaires are used to gather quantitative data from the participants. The questionnaires include both closed-ended and Likert-scale questions designed to evaluate various aspects of professional communication skill training. These aspects include the frequency of training sessions, perceived effectiveness, and the impact of these sessions on the overall school environment. The use of structured questionnaires allows for systematic data collection and easy analysis of trends and patterns.

Interviews: Semi-structured interviews are conducted with a subset of participants, including principals, vice principals, and subject heads. These interviews aim to provide qualitative insights into the challenges and successes associated with the management and implementation of communication skill training. The interviews are

designed to uncover detailed perspectives on issues not fully captured by the questionnaires and to gain deeper understanding of the practical implications and effectiveness of the training programs.

Focus Groups: Focus group discussions are held with groups of teachers and school management personnel to facilitate interactive and dynamic exchanges about the training programs. This method helps in exploring group-level perceptions and experiences, fostering a more comprehensive understanding of how communication skills training impacts school dynamics.

Data Analysis

Quantitative data from the questionnaires are analyzed using statistical software SPSS. Descriptive statistics, such as mean scores and frequency distributions, are employed to summarize and interpret the data. Inferential statistics, including t-tests and ANOVA, are used to examine differences between groups and assess the impact of various factors on the effectiveness of communication training.

Qualitative data from interviews and focus groups are analyzed using thematic analysis. This involves coding the data into themes and patterns to identify key insights and common issues related to the training programs. The qualitative analysis provides context and depth to the quantitative findings, offering a richer understanding of the factors influencing the success of communication skill training.

4. Results

4.1 Quantitative Data Analysis

The analysis of the quantitative data from the structured questionnaires provides the following insights into the management and effectiveness of professional communication skill training for primary school teachers in Duong Kinh District:

Frequency and Participation Rates: Out of the 164 participants surveyed, 78% reported attending communication skill training sessions at least annually. However, only 45% of teachers attend these sessions more frequently than once a year. Principals and vice principals have higher attendance rates compared to teachers, indicating a potential gap in the regularity of training for the latter group.

Effectiveness of Training Programs: The effectiveness of the training programs was rated positively by 65% of respondents. Principals and subject heads generally rated the training as more effective compared to teachers. There is a significant variation in effectiveness scores across different schools, with schools that have more structured programs reporting better outcomes.

Impact on School Environment: 72% of respondents observed a positive impact of communication skill training on the school environment. This includes improvements in classroom management and better interpersonal relations among staff. However, 20% felt that the training had no significant impact or even a negative impact, often citing issues with relevance and practical application of the training content.

Statistical Findings: Statistical analyses (t-tests and ANOVA) show significant differences in the perceived effectiveness of training based on the participant's role. Principals and vice principals reported higher effectiveness compared to teachers (p < 0.05). Moreover, more frequent training correlates with higher perceived effectiveness.

4.2 Qualitative Data Analysis

The thematic analysis of interviews and focus groups provides deeper insights into the management and implementation of communication skill training:

Challenges Identified: Key challenges include limited resources, insufficient time for training, and varying levels of commitment from staff. Interviewees highlighted the lack of practical application and relevance of training programs, emphasizing the need for more interactive and context-specific training.

Success Stories: Successful examples of communication skill training were found in schools with dedicated coordinators and well-structured programs. Effective practices included integrating training into regular professional development and involving teachers in designing training content to enhance its relevance.

Recommendations for Improvement: Recommendations for enhancing training effectiveness include increasing the frequency and duration of sessions, incorporating feedback mechanisms, and providing additional resources for practical application. There is also a call for greater involvement of all school staff to create a cohesive approach to skill development.

4.3 Integration of Quantitative and Qualitative Findings

Combining the quantitative and qualitative findings, it is evident that while communication skill training is generally perceived as beneficial, there are notable areas for improvement. The disparity between high effectiveness ratings among school leaders and mixed perceptions among teachers suggests a need for more inclusive and contextually relevant training programs. Addressing these issues could lead to more effective communication skill training across the district.

5. Discussion

The findings from the quantitative and qualitative analyses offer a comprehensive view of the current state of communication skill training for primary school teachers in Duong Kinh District. The results underscore both the achievements and the areas needing improvement, providing a foundation for proposing effective management measures (Hermans et al., 2008).

Frequency and Participation Rates reveal a notable discrepancy in training attendance. Although 78% of participants attend communication skill training at least annually, only 45% of teachers participate more frequently. Principals and vice principals demonstrate higher engagement levels compared to teachers, suggesting a gap in the regularity of training for the teaching staff. This discrepancy indicates a need to address barriers that prevent teachers from attending more frequent training sessions and to explore ways to enhance their engagement.

The Effectiveness of Training Programs shows that 65% of respondents view the training positively. However, the effectiveness ratings vary significantly between different roles, with principals and subject heads generally rating the training as more effective than teachers. Schools with well-structured training programs report better outcomes, highlighting the importance of a systematic approach to training. This variance suggests that while some schools benefit significantly from the training, others may struggle with less effective programs, pointing to a need for standardized, high-quality training practices.

Regarding the Impact on School Environment, 72% of respondents observed positive changes, such as improved classroom management and better staff relations. Despite these benefits, 20% of respondents felt that the training had little to no impact, or even a negative impact, often citing issues related to the relevance and practical application of the content. This mixed feedback highlights the need for training programs to be more tailored to specific school contexts and practical needs, ensuring they are relevant and applicable.

Statistical Analysis further reveals significant differences in perceived training effectiveness based on roles, with principals and vice principals reporting higher effectiveness than teachers. Additionally, a correlation exists between more frequent training and higher perceived effectiveness. This suggests that increasing the frequency of training sessions could enhance their impact, particularly for teachers who report lower effectiveness.

Qualitative Insights from interviews and focus groups identify several key challenges, including limited resources, insufficient time for training, and varying levels of staff commitment. The lack of practical application and relevance in training programs was

a recurring issue. Success stories from schools with dedicated coordinators and well-structured programs highlight effective practices, such as integrating training into regular professional development and involving teachers in content design. These examples underscore the potential benefits of a more interactive and context-specific approach to training.

Recommendations for Improvement based on the findings suggest several management measures. First, raising awareness about the importance of communication skills and their impact on the school environment can increase engagement and commitment from both school leaders and teachers. Strengthening needs assessments through regular surveys and feedback will help tailor training programs to actual needs. Refining goal setting to align with specific school contexts and improving training content and delivery methods can address issues of relevance and practicality. Enhancing training methods with interactive techniques and updating evaluation processes will ensure ongoing improvement and effectiveness. Finally, creating supportive working conditions for teachers will help them apply communication skills more effectively in their daily practices.

6. Conclusion

This study has examined the management of professional communication skill training for primary school teachers in Duong Kinh District, Hai Phong City, with a focus on building a happy school environment. The findings indicate that while communication skill training is generally perceived positively, there are significant areas requiring improvement. Despite a high attendance rate for annual training sessions, there is a clear disparity in engagement, with teachers participating less frequently compared to school leaders. The effectiveness of the training programs varies, with schools having more structured programs reporting better outcomes. However, a considerable proportion of respondents believe that the training lacks practical relevance and does not fully meet their needs.

The study identifies several key challenges, including limited resources, insufficient time allocated for training, and varying levels of commitment among staff. To address these issues, the study proposes several management measures. These include enhancing awareness about the importance of communication skills, conducting regular needs assessments, setting clear and context-specific training goals, improving the content and delivery methods of training, updating evaluation processes, and creating supportive working conditions for teachers. By implementing these measures, it is expected that the effectiveness of communication skill training will be significantly improved, thereby contributing to a more positive and conducive educational environment in Duong Kinh District.

References

- Alalwan, N., Cheng, L., Al-Samarraie, H., Yousef, R., Alzahrani, A. I., & Sarsam, S. M. (2020). Challenges and prospects of virtual reality and augmented reality utilization among primary school teachers: A developing country perspective. *Studies in Educational Evaluation*, 66, 100876. https://doi.org/10.1016/j.stueduc.2020.100876
- Berkhof, M., van Rijssen, H. J., Schellart, A. J., Anema, J. R., & van der Beek, A. J. (2011). Effective training strategies for teaching communication skills to physicians: an overview of systematic reviews. *Patient education and counseling*, 84(2), 152-162. https://doi.org/10.1016/j.pec.2010.06.010
- Brophy, J. (2006). Classroom management as socializing students into the academic community. *Theory Into Practice*, 45(1), 1-8.
- Brownell, M. (2015). Teaching children and adolescents with special needs. Pearson.
- Cornett, J. (2017). Teaching children and adolescents with special needs. Pearson.
- Cornett, J. (2017). Teaching with emotional intelligence: A guide for teachers. Routledge.
- Dobre, I. (2015). Learning Management Systems for higher education-an overview of available options for Higher Education Organizations. *Procedia-social and behavioral sciences*, 180, 313-320. https://doi.org/10.1016/j.sbspro.2015.02.122
- Ekman, P., & Friesen, W. V. (1975). *Unmasking the face: A guide to recognizing emotions from facial clues.* Malor Books.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of educational research*, 74(1), 59-109.
- Guffey, M. E., & Loewy, D. (2013). Business communication: Process and product. Cengage Learning.
- Guskey, T. R. (2002). Professional development and teacher change. *Teachers and teaching*, 8(3), 381-391.
- Hargreaves, A., & Fullan, M. (2015). *Professional capital: Transforming teaching in every school.* Teachers College Press.
- Heaven, C., Clegg, J., & Maguire, P. (2006). Transfer of communication skills training from workshop to workplace: the impact of clinical supervision. *Patient education and counseling*, 60(3), 313-325. https://doi.org/10.1016/j.pec.2005.08.008
- Hermans, R., Tondeur, J., Van Braak, J., & Valcke, M. (2008). The impact of primary school teachers' educational beliefs on the classroom use of computers. *Computers & education*, 51(4), 1499-1509. https://doi.org/10.1016/j.compedu.2008.02.001
- Huang, H., & Zhou, X. (2017). The impact of digital communication on professional communication in education. *Educational Technology Research and Development*, 65(3), 493-511.
- King, R. B., & Datu, J. A. (2017). Happy classes make happy students: Classmates' well-being predicts individual student well-being. *Journal of school psychology*, 65, 116-128. https://doi.org/10.1016/j.jsp.2017.07.004
- Martins, J., Branco, F., Gonçalves, R., Au-Yong-Oliveira, M., Oliveira, T., Naranjo-Zolotov, M., & Cruz-Jesus, F. (2019). Assessing the success behind the use of

- education management information systems in higher education. *Telematics and Informatics*, 38, 182-193. https://doi.org/10.1016/j.tele.2018.10.001
- Nguyen, T. T., & Pham, T. M. (2020). Educational reforms in Hai Phong: Challenges and opportunities. *Journal of Education Policy and Practice*, 11(2), 45-58.
- Pianta, R. C. (1999). Enhancing relationships between children and teachers. American Psychological Association.
- Soleimani, N., & Tebyanian, E. (2011). A study of the relationship between principals' creativity and degree of environmental happiness in Semnan high schools. *Procedia-Social and Behavioral Sciences*, 29, 1869-1876. https://doi.org/10.1016/j.sbspro.2011.11.436