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Résumé de l'article
Le mandarin, langue officielle de Taiwan, menace la survie du taiwanais, qui est la langue maternelle de soixante pour cent de la population de l'île. Dans le présent article, les auteurs discutent des résultats de leurs recherches précédentes et en cours et montrent la signification de la perte de la langue maternelle pour l'identité taiwanaise. Ils montrent également que la suprématie du mandarin sur le taiwanais et l'appui croissant en faveur de l'anglais à Taiwan laissent prévoir l'implantation d'un bilinguisme mandarin/anglais au détriment du bilinguisme mandarin/taiwanais. Les auteurs considèrent que les modèles d'enseignement bilingue immersif mis en place au Canada, en Finlande, dans le pays Basque et en Catalogne, s'ils étaient mis en œuvre de façon généralisée à Taiwan, pourraient contribuer à renforcer l'identité taiwanaise, à défendre le droit des jeunes à une éducation dans leur langue maternelle et à favoriser l'enseignement plus efficace de l'anglais.
CONFRONTING THE DEMISE OF A MOTHER TONGUE: THE FEASIBILITY OF IMPLEMENTING LANGUAGE IMMERSION PROGRAMS TO REINVIGORATE THE TAIWANESE LANGUAGE

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Abstract

In Taiwan, where Mandarin is the official language, the survival of Taiwanese, the mother tongue of sixty percent of the island’s inhabitants, is threatened. In this article, the authors discuss data from previous and ongoing research on the role of language and the significance of language loss in the quest for a “Taiwanese identity.” Research shows that the dominance of Mandarin over Taiwanese plus the growing support for English in Taiwan are likely indications that current Mandarin/Taiwanese bilingualism is being replaced by Mandarin/English bilingualism. Canadian, Finnish, Basque and Catalonian models of language immersion programs will be proposed as an alternative to Taiwan’s current language policy. The authors argue that such models, when applied to a significant degree in Taiwan’s primary education system, will contribute to strengthening Taiwanese identity, to defending the right of youngsters to receive their education in their Taiwanese mother tongue, and to creating more effective English language training.

Résumé

Le mandarin, langue officielle de Taiwan, menace la survie du taiwanais, qui est la langue maternelle de soixante pour cent de la population de l’île. Dans le présent article, les auteurs discutent des résultats de leurs recherches précédentes et en cours et montrent la signifiance de la perte de la langue maternelle pour l’identité taiwanaise. Ils montrent également que la suprématie du mandarin sur le
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1. An Old Language Policy for a New Taiwan

Shifts in generations and attitudes, combined with a change in political realities, have created a new Taiwanese nationalism, a force for local unity resulting in a potential new Taiwanese identity. But Taiwan is equally caught up in a contradiction between its economic, political, and cultural/linguistic realities.

Taiwan’s government is providing strong financial support to encourage education in the local cultures as well as the use of Taiwanese and other indigenous languages. After years of linguistic and cultural repression in the name of “Chinese nationalism,” there is a clear shift in the education curriculum away from China and toward Taiwan; this shift is generally referred to as “homeland education.” At the same time, English is the second target of Taiwan’s educational reforms, with an expanded semi-official role as a result.

The current government (DPP) follows an apparent liberal language policy. However, the reality of modern Taiwan is that parents, out of economic and pragmatic considerations, want foreign language education for their children. This situation seems inconsistent with the current government’s policy of forging a Taiwanese identity. The government’s conception of Taiwan calls for the development of a Taiwanese identity through (among other things) a unified and modernized national Taiwanese language.

In 2004, the authors conducted a nation-wide survey among Taiwanese mother-tongue speakers at seven universities. We found that, while 46%
of Taiwanese students indicated that they use their mother tongue “at home” and 51% “in the region where I live,” a mere 39% of respondents said they used it “with the general public when traveling in Taiwan.” The respective figures for Mandarin were 54%, 76% and 77%, pointing to a bilingual rather than diglossic linguistic landscape for Taiwan. This situation makes Taiwanese vulnerable to further language shift to Mandarin. Moreover, a mere four out of ten ethnic Taiwanese students used their language when speaking with Taiwanese people, and over two-thirds indicated they speak Mandarin when talking to other ethnic Taiwanese.

Any change in language policy involving mother-tongue education in Taiwan has to take into account an ongoing language shift from Taiwanese to Mandarin. In particular, decreased use of Taiwanese in the lower sociolinguistic domains (the “home” and the “marketplace”) needs to be addressed in such policy. At stake is the decades-old balance of Taiwanese/Mandarin bilingualism on the island, and therefore the survival of Taiwanese. The current language policy falls short on addressing this issue effectively. In the Gijsen et al. survey (2004b), over a third of Taiwanese students stated their unwillingness to raise their children in their mother tongue, further emphasizing the dire need for a drastic change in the current language policy.

2. Threat from Mandarin and English?

Recent Taiwan government announcements call for more closely regulated English instruction for young children, in order to control what some policy makers perceive as an uncontrolled flourishing of English “Cram Schools” on the island (Central News Agency, 2003). Some observers believe that such schools, in the long term, may prove to be an obstacle to the implementation of government language policy. This policy calls for a seemingly opposite trend to internationalization: the current Taiwanese government proclaims to focus attention increasingly on native languages like Taiwanese and Hakka. Parents, on the contrary, eager to have their children become “perfect” English/Mandarin bilinguals, are increasingly turning to non-public language education to achieve their goals, thereby sidetracking or even avoiding the government’s “homeland” education policy. It seems that Taiwan’s
language policy does not appeal to a substantial number of pragmatic-minded parents and students alike (Gijsen et al., 2004b).

Chang (2004: 6) argues that Taiwan’s current educational policy is turning the island into an uncertain society with confused values, caught between the pressures of local and international demands. He gives the example of a primary school pupil called “Chun-chun” who is receiving the most “diverse” language education: Hakka (an aboriginal language) in the early morning, Taiwanese later the same morning, Mandarin in the afternoon, and English to end off the school day. As if this were not enough, on Fridays and Saturdays Chun-chun attends Taiwanese and English language classes in a Cram School. An important question, according to Chang, is whether children in the first year of primary school are able to take this all in. The author maintains that some children hate local language classes, because they do not want to learn Taiwanese. Even the children’s Taiwanese parents are often unable to understand the new Taiwanese textbooks that their children learn from (Chang, 2004: 7).

Chang argues that confusion arises from an educational policy that requires children to use phonetic symbols to learn Mandarin, and Romanization to learn Taiwanese and Hakka. Parents seem to be uninterested in the results, as long as their children do not complain or reject the classes. By contrast, Chang claims that both parents and the Education Ministry agree on the importance of improving English language ability, stressing the dominance of English over local languages in education on the island (Chang, 2005: 8). Mainly because of pressure from parents who strongly support English unofficial cram school education, Taiwan’s government is widely publicizing that it intends to raise the profile of English to that of a semi-official language by the year 2010.

Our survey seems to justify the motivation behind such policy: 83% of students answered that learning English was a “very high” priority for them, with 69% of respondents expressing agreement that the language should be introduced “at primary school level or sooner.” It thus seems that many Taiwanese students, like the majority of parents, have clearly made their choice about the relative importance of localization (the government’s “homeland education”) and internationalization (the importance attached to English in Taiwan).
Our survey results furthermore support the view that English in Taiwan is often used as a visual cue to represent stereotypes, especially for young people: 65% of Taiwanese respondents expressed the view that they “admired American culture,” compared to 43% for Morocco, 38% for Germany, 37% for Belgium and only 29% for Japan. Thus, English in Taiwan has become associated with the “advanced countries,” such as the United States or the United Kingdom.

However, research results from Chen and Chang (2003) point to the very superficial nature of English learning in Taiwan. The authors argue that, rather than bringing children and students in contact with the richness of cultures associated with the language, English in Taiwan is being adopted as a simple communication tool – nothing more. Likewise, Warden’s study of motivations for studying English in Taiwan concluded that the main motivation was increased financial well-being, an aim that is reinforced by the island’s language policy (Warden and Lin, 2000: 15).

The public’s dissatisfaction with the outcome of the English educational policy is best reflected in newspaper editorials (e.g., *Chinapost* 25/3/2005, *Taipei Times* 20/2/2005), magazine articles (Chang 2004, *Sinorama*) and call-in shows on local television. The national testing centre administering the entrance examination for prospective teachers reported that in March 2005, more than 10 percent of the exam candidates received a zero on the composition section of the English test and that 30 percent of the examinees scored a zero on the translation section of the test (*Chinapost* 25/3/2005). The examinees’ low scores are widely seen as a condemnation of the way English, in particular at the high-school level, is taught in Taiwan.

By choosing English over its Taiwanese mother tongue, does the Taiwanese public lack a sufficient sense of local consciousness of or identity with its own culture? Most people seem content to consider Taiwanese as a “spicy vernacular,” the language of taxi drivers and street vendors. The language of literature, it seems, is Mandarin. The language associated with making a decent living is English.

Many Taiwanese seem to feel that learning English is all it takes to be international, to be more successful economically, or that learning English at the very least marks the first step on the road to internationalization. However, should internationalization be limited to being taught in English
and increasing the use of that language? Or, on the contrary, should informed educators and policy makers alike not constantly try to convince youngsters that recognizing only English actually weakens international vision? Should a foreign language not be offered in such a way that it does not encroach upon mother tongue education? (see Part 4. “Trilingual Primary Immersion Education for Taiwan?”)

By using outdated teaching methods and implementing an equally outdated language policy, Taiwan might well be on its way to becoming a mere element of the global mainstream, a situation that would be counterproductive to the acquisition of a proper Taiwanese cultural (and general) identity.

3. Standing up for the Taiwanese Language

The main problem from a pragmatic viewpoint is that Taiwanese has not been standardized, and some openly question its expressiveness. Over three-quarters of Taiwanese students prefer English and Mandarin over Taiwanese as their language of intellectual expression (Gijsen et al., 2004b). A uniform Taiwanese writing system is still being debated; the Romanized system, although popular with most Taiwanese language researchers (Chiung, 2001), does not receive the popular support needed to raise the status of Taiwanese to a language considered worthy of “intellectual expression.” Therefore, the majority of recent Taiwanese texts still remain a mixture of Mandarin ideograms and Romanization.

Lu Guangcheng, co-editor of the University Taiwanese Reader, states that without a written tradition, a language can easily die out. He furthermore asserts that about 60 percent of the Mandarin and Taiwanese written lexicon is shared, but that finding characters to express the 40 percent unique to Taiwanese remains a challenge for dedicated individuals such as himself.

Through our survey, we found that a mere 29% of ethnic Taiwanese students approved of making Taiwanese an official language. In a similar survey conducted by the Formosa Foundation seven years earlier, 61% of Mainlanders opposed making Taiwanese an official language, Hakka people were evenly divided on the question with 40% for and 40% against. By contrast, 74% of student-respondents agreed to make English Taiwan’s second official language. More research is needed to come to
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Our survey furthermore established that 72% of respondents stated that their mother tongue was Mandarin, with a mere 48% of respondents stating that their mother tongue was Taiwanese.

Huang’s comment (1988: 96) is probably still valid in today’s Taiwanese society: people who learned Taiwanese at home from their families nevertheless came to believe that Mandarin was their mother tongue due to factors of “social psychology” because five decades of political indoctrination told them so. Relevant research, to establish whether people’s linguistic identification is changing due to the shift in political leverage away from Mainland China toward a more pro-Taiwanese-language stance, is overdue.

Though there are many people singing the praises of the hidden elegance of Taiwanese, there are very few (albeit sincere) people involved in trying to make Taiwanese more functional. At linguistic conferences meant to provide answers to the urgent matter of deciding upon a uniform writing system for Taiwanese (Gijsen et al., 2004b), the most prominent language researchers do not seem capable of refraining from the academic practice of criticizing the few sincere people genuinely pre-occupied with the fate of their mother tongue.

Some of this criticism is probably well-founded if one considers, for instance, that much of the most important Taiwanese language journal (Tai-bun Thong-sin) is incomprehensible to a native Mandarin speaker, as well as to most Taiwanese speakers. Likewise, at a recent international conference on the Romanization of Taiwanese in southern Taiwan, proceedings were printed in written Mandarin, English and Taiwanese, with hardly any of the participants referring to the latter (Gijsen et al., 2004a).

Researchers at Taiwan’s highly esteemed Academic Sinica do not seem immune from being unable to focus on matters most pressing in Taiwan’s language policy. Yu Bo-cyuan (Chen, 2001: 14), for example, did a survey of all teachers in a Taipei high school and asked the question: “What is more important, classes for teaching English or classes for teaching students their mother tongue?” It is disappointing to see, from a
sociolinguistic viewpoint, that some of Taiwan’s academic elite perceive mother tongue education to fall under the same category as learning a foreign language. It is, after all, widely accepted (Mercator, 2004) that a child has the right to receive his/her full general education in the mother tongue. Moreover, ongoing language projects in European Union countries with linguistic minorities are successful in their policy of teaching English without endangering mother tongue education (see Mercator Education, 2004, “Trilingual Primary Immersion Education for Taiwan?”).

Despite efforts by individual teachers to encourage a “natural bilingualism” (a term used by Wmffre, 2001) through the use of Taiwanese to teach, for example, mathematics, our survey results show that students in Taiwan are becoming increasingly monolingual. The language shift from Taiwanese to Mandarin is continuing, contrary to suggestions by other scholars that Taiwanese is becoming a more dominant language in certain parts of Taiwan. Survey results furthermore reveal that few students with Taiwanese as their mother tongue show concern about the language shift to Mandarin and English, since everything seems to be proceeding “normally.” To the question of what language they judged to be “the best language to use in Taiwan,” over 80% of students responded “Mandarin,” with “Taiwanese” receiving 13% of the support.

As mentioned, some Taiwanese language researchers have announced a revival of Taiwan’s native languages (Liao, 2000; Chan et al., 2004). Politicians who were once monolingual now speak Taiwanese in public appearances; this is taken as a strong indication that Taiwanese is gradually becoming a more dominant language in public and private discourses. Sociolinguistic research is now more focused on the demise of Hakka and other aboriginal languages, with the apparent implication that Mandarin as a dominant language is encroaching upon these languages only. The problem of the loss of Taiwanese as a mother tongue is avoided by suggesting, for example, that the term “mother tongue” be assigned a new meaning in the “Taiwan context” (Chan et al., 2004: 86).

Some sociolinguistic misperceptions concerning the Taiwanese language might stem from confusing linguistic and political realities. Most Taiwan-based sociolinguists argue that the majority of Taiwanese
“could still survive well” by using Taiwanese in daily life. We believe that such affirmations require more detailed explanations, and we argue that the opposite holds true for Taiwan’s university students. When we asked Taiwanese mother-tongue speakers what they judged their language proficiency to be, only 22% answered “good” language proficiency in Taiwanese, with 47% choosing “quite good.” The language proficiency for Mandarin stood at 73% (“good”) and 22% (“quite good”), signalling that a language shift from Taiwanese to Mandarin has already taken place among Taiwan’s university students.

Chan (2004) argues that Taiwanese mother-tongue speakers tend to use Mandarin more in high domains (government, education), while the lower domains are predominantly Taiwanese. Our research results show that it is precisely the low domains (home, marketplace, language used with friends) that are being encroached upon by Mandarin. Moreover, while the higher domains of language use in Taiwan do belong to Mandarin, English is increasingly letting its dominance be felt as Taiwan’s lingua franca par excellence; Taiwan’s students indicate that they would one day prefer to raise their own children in English rather than Taiwanese.

Gijsen et al. (2004a, 2004b) have therefore suggested that a double language shift is taking place in Taiwan: in the lower domains from Taiwanese to Mandarin, in the higher domains from Mandarin to English, the latter with active government and public support. Whether Taiwanese stands to lose out because of the dominance of English deserves further research. But considering that Mandarin and Taiwanese are in a bilingual rather than diglossic linguistic relationship, this situation seems very likely (Fishman, 1977).

4. Trilingual Primary Immersion Education for Taiwan?

4.1. Background

As is the case in Taiwan, a strong trend toward regional awareness is taking hold in most European linguistic communities. This is reflected in the growing attention paid to education for European regional or minority languages. Trilingual primary immersion schools in Europe opened their doors in 1980 (Diwan schools in Brittany, France) and are modeled on the
Canadian immersion schooling system. They are currently a growing phenomenon all over Europe.

In 2004, fifteen linguistic regions in Europe were involved in elaborate trilingual primary education programs, among which Catalonia, the Basque Country, Friesland, Swedish communities in Finland (immersion education), Northern Germany, Slovenia and Northern Italy (limited immersion education). Trilingual primary immersion projects are encouraged through ongoing research by the European Commission and financed by private institutions and (in part) by the respective region’s autonomous government.

The concept of trilingual immersion education takes advantage of seemingly opposite trends: internationalization and regionalization. The point of departure is that attention paid to the English language does not have to be at the expense of either the regional (minority) language or the national language, and vice versa. The very principle behind immersion teaching is not to teach the language as a goal in itself, but to use the language as a means to learning in various areas of activity. In other words, the language of instruction can be either the first or second language of the pupils for all of the different subjects included in the curriculum, but a subject should not be taught solely in this language throughout the whole obligatory education period (Marsh and Lange, 2000). English, for instance, could be used to teach the sciences, while mathematics and the humanities could be taught in the mother tongue and the official (state) language(s) respectively.

Many new trilingual initiatives at primary school level are called for by linguistic minorities in numerous countries, although only minority languages defined as such by the European Bureau for Lesser Used Languages are considered in Europe’s trilingual primary immersion projects. The definition of a minority language, as applied by the Bureau, is broad and could well apply to the situation in Taiwan:

… a language which is not the most used language of the member state. (…) Finally, there are languages which may well be spoken by a minority in a particular member state, but are also the language of the
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Trilingual primary immersion education thus pays attention to (a) the region's own language, (b) the state language and (c) a foreign language, including a foreign language not actively used in daily life (Mercator, 2004: 5). With some exceptions, immersion education teaches pupils aged six to eleven three different languages, with each language used as a medium of instruction for one or more subjects in the curriculum. In Brittany (with Breton the minority language), English is only introduced in immersion schools when the pupils have reached the age of 11. Pupils then receive six hours a week in English. However, because of the advantages immersion education in French and Breton have given them from grades one to five, pupils are very successful at “catching up” on students from traditional bilingual schools (Breizh, 2005). As is the case in immersion schools elsewhere in Europe, English in the Breton immersion schools is considered a language of discovery, not a “scholarly material.” By 2000, Breton pupils outperformed those from traditional French schools in national English examinations (Eurydice, 2001).

In the Basque Country (Spain), pupils attending trilingual immersion programs are between four and six years old, although the latter seems to be the general rule for immersion education elsewhere in Europe. In Frisia, the introduction of the Frisian mother tongue as the language of instruction of curriculum subjects varies per school, depending on the use of Frisian in the local community's daily life. Teaching in English usually starts when pupils are ten, although some schools introduce English at the age of eight (Mercator, 2004: 55).

4.2. The Feasibility of Primary Immersion Schooling for Taiwan

Traditional trilingual primary education is found throughout Taiwan, since the government policy encourages the early introduction of several languages. In accordance with the official language policy for the revised national language curriculum, Taiwanese and other indigenous languages recently became a compulsory part of the island’s primary education (Ministry of Education Taiwan, 2004).
At the primary education level, Taiwanese pupils who are seven or eight years old receive an average of 102 hours of teaching in Mandarin, 20 hours in Taiwanese (mainly a language course), Hakka, or another aboriginal language. This pattern is basically maintained throughout primary education, with a slight increase in Mandarin-taught courses from third grade (nine years of age). English is (officially) introduced in the fifth grade (eleven years of age, Tainan Bao-xi Primary School), although schools are basically free to decide when to introduce English. However, as mentioned earlier, most parents have sent their children to English Cram Schools by the time pupils are “introduced” to English in Taiwan’s primary school system.

Let us consider the following comparison: in Finland’s immersion education programs (Swedish as minority language), the first language, Finnish, is used two hours a week in primary school, while English is used one hour a week. The rest of the time (17 hours a week) is spent with Swedish as the language of instruction for all subjects which are offered during the first and second grades (handicrafts, mathematics, physical education, arts, music, religion, environmental studies). In the third and fourth grades, Finnish is used seven hours a week; the remaining time (except English) is taught in the second language (Swedish). The language of instruction for physical education is different for boys (Swedish) and girls (Finnish), an example of how the curriculum has been adapted to give it a more individual character. The time used to teach in English increases from one hour a week to only two hours a week (grades three through six), with the introduction of a fourth language in the fifth grade (Erasmus, 2004).

When comparing Taiwan’s language education with Catalonia, the differences in mother tongue education are even more pronounced. By the time an ethnic Taiwanese pupil has finished primary education in Taiwan, he or she has received a total of approximately 100 hours in mother tongue education, and about 550 hours in Mandarin (official language). As mentioned earlier, language classes in Taiwanese are only partly content-based: they focus mainly on teaching pupils the Taiwanese language, with limited attention given to “Taiwanese culture.”

Catalonian immersion schools offer pupils 768 hours of education in both the official (Spanish) and the minority (Catalan) language. English
immersion education accounts for 350 hours, with the option of taking French as a fourth language. Foreign and fourth languages are used for different content areas (subjects) in different schools throughout Catalonia, from mathematics to music, and depending on local conditions as well as parents’ preferences. English in Taiwan’s primary schools is offered only to teach the language and sometimes taught by English native speakers with no knowledge or understanding of either the local language or the local culture.

With the teaching of English in Taiwan’s primary schools being exclusively language-driven, content-driven programs modeled on those in Europe are not the object of experimentation or research. Instead, Taiwan’s official language policy seems to be based on the assumption that, if the child is introduced to English at a sufficiently young age, benefits will follow. Immersion schools in Europe seem to differ; Swedish immersion schools in Finland, for example, start to use English when children turn five (as of 2004). In most Catalan immersion schools, children start receiving English education at the age of ten. In the latter case, the English teacher teaches three courses in the morning and the Catalan and Spanish teachers split the day’s remaining courses. Catalan is used as a language subject and as a language of instruction to teach the social sciences; Spanish is used as a language subject and to teach mathematics; English is used as a language subject and to teach natural sciences (Mercator, 2004: 68).

Two potential problem areas for immersion education in Taiwan are misguided government policy and the lack of public support (both discussed above). Language immersion programs in Europe were made possible through a joint effort between local communities (in particular parents), local governments (most of which enjoy a high degree of autonomy, such as Catalonia) and groups of motivated research teams in the respective language minority communities (The Frisian Academy, the Basque Country University, The University of Vaasa in Finland, among others).
5. Conclusion

With official support for Taiwanese vocal but ineffective and public support low to moderate, the feasibility of Taiwanese immersion language schooling is questionable in the current conditions. The public in Taiwan has to be made aware that their mother tongue is being encroached upon by Mandarin and English. Most Taiwanese will still frown upon the suggestion that one day their mother tongue might not be used any longer in daily life. With the support of and initiatives from the academic community in Taiwan, a meaningful change in language policy can be forthcoming. Research into pupils’ and parents’ attitudes toward immersion language schooling in Europe shows that pupils are excited about learning English as well as their mother tongue, whereas non-immersion pupils sometimes seem to have very low expectations about their own abilities (Bjorklund and Suni, 2000a; Bjorklund, Still and Suni, 2000b; Genesee, 1998).

The Taiwanese have a choice: face the loss of their mother tongue within a generation or two, or embark upon a drastic change in the island’s education policy. Looking for guidance in European language immersion education efforts would not only increase language proficiency in local as well as foreign languages, it could furthermore lead to the much desired development of a local Taiwanese identity.

Bibliography


Mercator Education. (2004). *Trilingual Primary Education in Europe*. Inventory of the Provisions for Trilingual Primary Education in Minority Language Communities of the European Union.


Innovation & Reflection Conference. Hong Kong University of Science and Technology.