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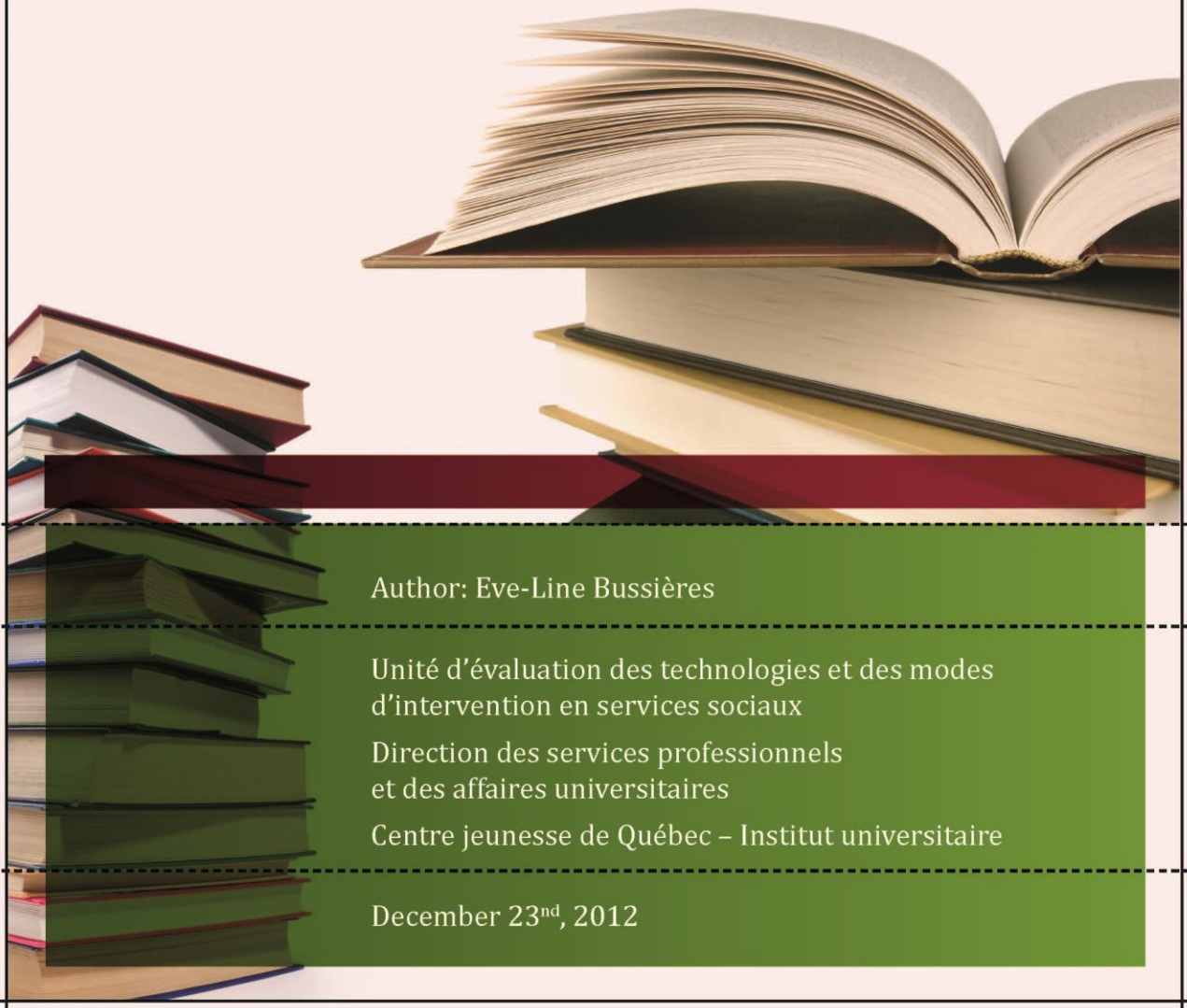
HTA at Organizational Level: a Case Study. TheCase of Snoezelen© Rooms for Severly Neglected/Maltreated Children.



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HTA at organizational level : A case study

The case of Snoezelen rooms for severly neglected/maltreated children

Introduction

The present mini-health technology assessment (mini-HTA) at organizational level is realized following a request of the *Centre jeunesse de Québec-Institut universitaire* (CJQ-IU), which is a university-based youth protection agency in Quebec city, Canada. The CJQ-IU retains more than 2000 new reporting each year and offers services to more than 6000 children and families every year. The CJQ-IU is developing a new residential care center for severly neglected/maltreated children, *Le Petit Blanchon*, in which they would like to implement a new technology: a Snoezelen room. Snoezelen rooms is a trademark who refer to multi-sensory environments and are designed to provide sensory stimulation to users through a range of visual, auditory, tactile and olfactory equipment (Bozic, 1997).

A mandate has been given to the CJQ-IU's HTA-unit from *Le Petit Blanchon's* principal manager and a comity of clinicians working there, to review the evidence on the effectiveness and safety of the Snoezelen approach and to provide data on the organizational and economic issues related to the implementation of two Snoezelen rooms in *Le Petit Blanchon:* a white room and a stimulation room.

The technology

Introduced in the '70s, Snoezelen is inspired by an approach used in Holland, which implies relaxation and sensory exploration. *Snoezelen* is a contraction of two Dutch words: *snuffelen* (meaning "to discover or explore") and *doezelen* (referring to a relaxed state). There are three kinds of Snoezelen rooms: the white room, which incites to relaxation with its soothing ambiance. The second, the interactive room, gives to the person the possibility to interact with different kind of objects, some reacting to voice or making sounds. The third one is a motor room; tunnels of vibrating cushions, swings and other unusual games modules encourage the person to explore her environment (Blondel, 2003).

The idea behind Snoezelen rooms lays in the theory of sensory integration. Treatment concepts that are related to sensory integration come from a body of work

that has been developed by an occupational therapist by the name of A. Jean Ayres, in the 1950s and 1960s. Cermak and Groza (1998) state that “sensory integration is the process by which individuals organize and interpret information received through their senses in order to successfully meet environmental challenges” (p. 8). The brain’s function is to sort and organize all the sensations that enter the human body. So, when the sensations flow into the brain in a well-ordered manner, these sensations are used to form appropriate perceptions, behaviors, and learning. Thus, when sensory information is processed accurately in the brain, the foundation for emotional development, social relationships, physical integrations, and cognitive performance is developed (Cermak & Groza, 1998).

Children who has experienced neglect or maltreatment may present sensory integration problems. These difficulties are mostly invisible and do not imply any physical problem with the actual sense organ, such as their actual eyes or ears. Instead, the issue relies in how particular sensory information is being processed by the actual brain (Da Silva, 2011). Maltreated children have faced early adversity, like traumatic events associated with physical or sexual abuse, which can generates some form of sensory dysfunction. The logic behind the Snoezelen approach is that trough plasticity, the brain is able to reorganize neural pathways on the basis of new experiences. This reorganization, or process of sensory integration, cannot be observed; it is an internal process, hypothesized on the basis of evidence from neuroscience. Although the process of sensory integration is not observable, the resulting deficits and remediation are observable. Following this philosophy, if we expose children to new, positive stimulation, it is possible to help them reorganize their neural pathways and possibly improve their development and quality of life in an observable manner.

This is the premise behind the CJQ-IU’s intention to implement a Snoezelen rooms: helping children achieve a better development and well-being. Snoezelen room is an innovative way of addressing these children’s special needs. At CJQ-IU, the proposal is to implement two Snoezelen rooms: a white room and a motor room. The white room for the soothing and relaxing environment (anxiety) and the motor room to

address the developmental delays that these children present. The two rooms would be used as treatment procedure to address anxiety of maladaptive behavior showed by six children (3-8 years old), living at *Le Petit Blanchon*, who have experienced severe neglect or maltreatment. The actual practice at CJQ-IU and *Le Petit Blanchon* doesn't imply any similar procedure. Snoezelen will represent a new approach which will lead to the recognition of sensory integration problems among certain child, the treatment of this problem, which in turns can help and prevent behavior problems.

The evidence

The promotors

The promotors of Snoezelen® have long been against any form of evaluation of the efficacy of Snoezelen because it contradicts the philosophy behind Snoezelen: "a non-structured environment without any aim of performance" (Martin & Adrien, 2005). The idea is to offer a safe environment to a person, who decides what kind of activities she wants to do, in an? unstructured way. The clinicians are a facilitator and does not lead the treatment. This unstructured manner of using it makes every session different and complicates the evaluation of its effectiveness.

CJQ-IU

In 2010, a (unpublished) systematic review was done by two research assistants working at the CJQ-IU (Dion, Nadeau-Cossette, Dionne & Drapeau, 2010). They reviewed nine articles addressing the effectiveness of Snoezelen with children and adolescents. One study was done with a maltreated child sample, but was an unpublished paper (Bachand & Lecompte, 2008). Another study was conducted in an institution for delinquant adolescents, and was an unpublished thesis (Pierret, 2002). The other studies included mostly samples of intellectually disabled children (Houghton, & al., 1998; Shapiro, Parush, Green, & Roth, 1997; Smith, Press, Koenig, & Kinnealey, 2005; Tunson & Candler, 2010). The other three studies included a sample of children presenting developmental delay (Shapiro Sgan-Cohen, & Melmed, 2009), severe brain injury (Hotz et al., 2006) and a sensory modulation problem (Schaaf & McKeon-Nightlinger, 2007).

The results of this review show that the three articles addressing anxiety symptoms observed significant improvement. Behaviors like stereotypy or repetitive behaviors showed improvement also, maybe as a consequence of reduced anxiety. Even if these results are positive, the authors conclude that the quality of studies included didn't allow to determine the effectiveness of Snoezelen, because the level of evidence is too low. This doesn't mean that it's ineffective, but more empirical research is needed to be able to answer this question. Future research should include larger samples and foster experimental designs.

Grey literature

The review of grey literature as allowed us to identify local initiatives of implementing Snoezelen, for example in three Child Welfare Centers in the province of Quebec: Montreal, Laurentides and Laval. A local evaluation of Snoezelen was done by the Laval Child Welfare Center between March and October, 2008. During this period, 52 clinicians and 111 young person (mostly adolescents) used the Snoezelen room. Data was obtained by questionnaire. Of all the young persons who used Snoezelen, 66% report a lower level of stress following a Snoezelen session. The clinicians report having discover new capacities among the children they accompanied in a Snoezelen session, capacities like good relational abilities, sense of responsibility (eg. making choice for themselves) and good adaptation capacities. Overall, the Snoezelen experience was positive. However, these are preliminary, unpublished results.

Scientific literature

In the scientific literature, studies on Snoezelen has mostly addressed the effectiveness of Snoezelen among elderly showing dementia (Burns & Cox, 2000; Spaull & Leach, 1998; Van Weert, 2005), adults with intellectual disabilities (Cuvo & al., 2001; Hogg & al., 2001) or with autism (Fagny, 2000; Martin, 2003). These studies all used an observational design. Very few studies were conducted with young children, and those who did, addressed the effectiveness of Snoezelen among children presenting a specific disorder like intellectual disability (Nasser, Cahana, Kandel, Kessel, & Merrick, 2004; Shapiro, Parush, Green, & Roth, 1997) or severe brain injury

(Hotz, Castelblanco, Lara, Weiss, Duncan, & Kuluz, 2006). To our knowledge, no study has addressed the effectiveness of Snoezelen rooms among neglected/maltreated children.

A meta-analyis was published in 2009 addressing the effectiveness of Snoezelen for individuals with intellectual disability, including children (Lotan & Gold, 2009). For the purpose of this mini-HTA, a quality assessment of this meta-analysis was done using the PRISMA checklist (see Appendix 1). The quality of this meta-analysis is moderate/high. The authors didn't assess risk of bias in the included studies, but they did subgroups analysis, used random effects, which is appropriate for such heteregeneous studies, and looked at heterogeneity. This 2009 meta-analysis will be used in the present report to synthesize the evidence around Snoezelen, because its quality is sufficient and the meta-analysis is recent. Ten studies were included in this meta-analysis, all using an observational design. Two sets of meta-analysis were performed: a set of planned meta-analysis on the effects of Snoezelen compared to different comparison conditions (baseline, active intervention, non-active control condition). The effect sizes range from .63 to 2.63, which are considered strong associations. The second set of meta-analysis was an exploratory meta-analysis on the effects of Snoezelen by subgroup (design: between groups, pre/post, assessment situation, outcome type). The effect sizes range from 0.84 to 2.25. The authors conclude that this review provides some initial support to the assumption that Snoezelen has value as therapeutic approach, but highlight the need for rigorous research. The authors highlight the importance of implementing Snoezelen in a conventional therapeutic regime (a structured intervention period according to pre-set standards framing intervention period, gradual beginning and ending).

It is noteworthy that no studies have addressed the safety of the Snoezelen approach. It appears essential in the context where the mechanism implicated remains unclear and implies neurological functions. No studies have reported adverse effects, but the focus wasn't on safety; they could have missed negative consequences if they occurred. This aspect should be kept in mind.

Overall, the level of evidence regarding the effectiveness of Snoezelen is low, especially because no RCT were found. There is a meta-analysis (Lotan & Gold, 2009), but it included only observational studies (with methodological pitfalls). There is an obvious need of rigorous research addressing not only the effectiveness of Snoezelen, but also the safety of this technology.

The patient

Indeed, from a patient point of view, the safety of this technology is an issue. As the safety of the approach hasn't been demonstrated, there are ethical considerations of using Snoezelen rooms. No studies report side effects or negative consequences associated with its use, but none of them was addressing safety issues. They may have missed it if they occur. It would be important to consider monitoring these negative consequences following the use of Snoezelen at *Le Petit Blanchon*.

In another hand, considering the report of improved well-being and symptoms of anxiety in many studies (see review by Dion & al., 2010), it would be questionable to not offer this treatment to the most vulnerable children who suffered from adverse environment and sometimes trauma. If there is, at least, a little chance to improve their well-being and quality of life, why not try it and make an assessment?

The organizational level

As some authors have highlighted, the implementation of a Snoezelen room implies a specific training for clinicians that will work with children in this multi-sensory environment (Lotan & Shapiro, 2005). Using Snoezelen rooms also imply to work with 1:1 ratio, in order to actualize the individual approach. This very low ratio can generate additional cost (Orain, 2008). In the residential care center *Le Petit Blanchon*, an individualized approach is already promoted, so it won't add extra cost. In addition, the physical setting is already organized to receive two Snoezelen rooms.

For now, only the six children living at *Le Petit Blanchon* will have access to the rooms; the deployment of this room will not affect other departments of the CJQ-IU. However, it is possible that the service will be offered to other children receiving services at CJQ-IU later on. No collaboration with external resources is anticipated for the moment.

Three other Child welfare center has already developed a Snoezelen room: Montreal, Laval and Laurentides. In addition, rehabilitation center for intellectually impaired children used them, like the Centre de réadaptation en déficience intellectuelle de Québec (CRDI), but to our knowledge no study were carried out so far in these settings in order to evaluate the safety and effectiveness of Snoezelen.

The economic level

This section presents the economic evaluation of implementing two Snoezelen rooms at *Le Petit Blanchon*. First, the implementation costs will be presented for two Snoezelen rooms. The start-up cost for implementing two Snoezelen rooms in the CJQ-IU is estimated to be the following:

Table 1. White room

ITEM	PRICE
Fiber optic	1600$
Technical equipment for music and lights (Solotech)	7000$
Mirror	300$
Pillows, cushions, vibrating objects	1000$
TOTAL	**9900$**

Table 2. Motor room

ITEM	PRICE
Toys, objects for motor skills	5000$
TOTAL	**5000$**

It is important to add to these implementation costs (14900$), the additional costs generated by staff training. For example, if then clinicians are going to use the Snoezelen rooms, it is possible to estimate a cost of 4900$ for training (2 days training=14h x 35$/h=490 x 10 clinicians=4900$). These costs are consistent with the information available in the literature (Cuvo, May, & Post, 2001). We do not add costs for actualizing the 1:1 ratio needed with the Snoezelen approach, because clinicians working at *Le Petit Blanchon* are already working in a context of low ratio.

An additional cost of implementing a Snozelen room is the hiring of an occupational therapist, which is the specialist of the assessment and treatment of sensory integration deficits. As some authors have stated, the implementation of a multi-sensory room like Snoezelen should be managed by an occupational therapist (Da Silva, 2011). No occupational therapist actually works at CJQ-IU. The annual costs for this professional service (three days/week) is 54 500$. Consequently, the total implementation cost of two Snoezelen rooms is 74 300$.

Secondly, the annual functioning cost of the two rooms is calculated. The rooms will be implemented in a permanent way in the residential care center *Le Petit Blanchon*; there will be no recurrent costs once the rooms are installed. No additional staff is needed for the regular functioning of the Snoezelen rooms; the clinicians already working at *Le Petit Blanchon* will be using them, in a certain percentage of their time. If we estimate that 10 clinicians will be using it 10% of their time, the opportunity cost would be 1225$ (3,5hrs x 35$ x 10 clinicians).

It is not possible to estimate the saved annual cost, considering that implementing a Snoezelen room generates only additional costs for the moment. Although, it is possible to postulate that if this technology proves effective, long-term costs can be saved related to the management of behavior problems among *Le Petit Blanchon'*s children. Indeed, it is possible to think that if the use of Snoezelen reduce maladaptive behaviors and improves children's functioning, this could contribute to lower the long-

term cost of caring for these children who necessitates a lot of attention because of their behavior problems.

Some uncertainties apply to these calculations, concerning the long-term use of the room, the length of life of the devices and the need to fix them periodically. Another aspect to keep in mind concerns the possibility to experience staff turnover, which would means new staff to train.

Conclusions and recommendations

- Considering that Snoezelen is a costly technology to implement and that positive effects of its use remains to be demonstrated with more powerful research design.
- Considering the large effect sizes demonstrated in the Lotan & Gold (2009) meta-analysis.
- Considering the promising impact on children well-being, especially vulnerable children, we recommend:
  1) The implementation of Snoezelen following a structured manner, as recommended by Lotan & Gold (2009).
  2) To conduct a research and collect data to monitor the impacts on children well-being and general functioning. The choice of outcome measure should be done very carefully, in order to include not only pre/post measures, but also more global aspects of development outside the Snoezelen procedure, to determine if generalization occurs. This recommendation is supported by Lotan & Gold (2009) who highlighted in their meta-analysis the importance of choosing more meaningful outcomes and not only rely on pre and post measures. Finally, adverse effects or negative consequences should be documented, as no data are available on the safety of this technology.
  3) That the implementation of the Snoezelen rooms at *Le Petit Blanchon* should be managed and followed by an occupational therapist.
  4) That even if some settings has used Snoezelen for this purpose, we do not recommend using Snoezelen rooms as a measure of contention or restraint.

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Appendix 1

PRISMA checklist for quality assessment

Quality assessment of the Lotan & Gold (2009) meta-analysis

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both. Yes	207
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. Incomplete summary, criteria unclear, no effect sizes reported in the summary	207
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Yes	208
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). Yes	208
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. No	_____
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. No	_____
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. Yes	208
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. Only keywords, no year/country limits mentioned,	_____
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). yes	208
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. No	_____
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. Yes, well done	209-211

Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. No	_____
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means). Yes	211
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis. Yes	211

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies). Not mentioned, no funnel plot	____
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. Yes, planned multiple meta-analysis and exploratory subgroups analysis	212
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. No flow diagram but a table of included and excluded articles	210
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. Yes	209
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). no	_____
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. Effect size not detailed, no confidence interval, no forest plot	_____
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency. Effect sizes and heterogeneity	212
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15). No	_____
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). Subgroups analysis	212
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers). Yes, clinicians	213
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). Yes, review-level	214

Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research. Yes	213-314
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. Yes	214

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

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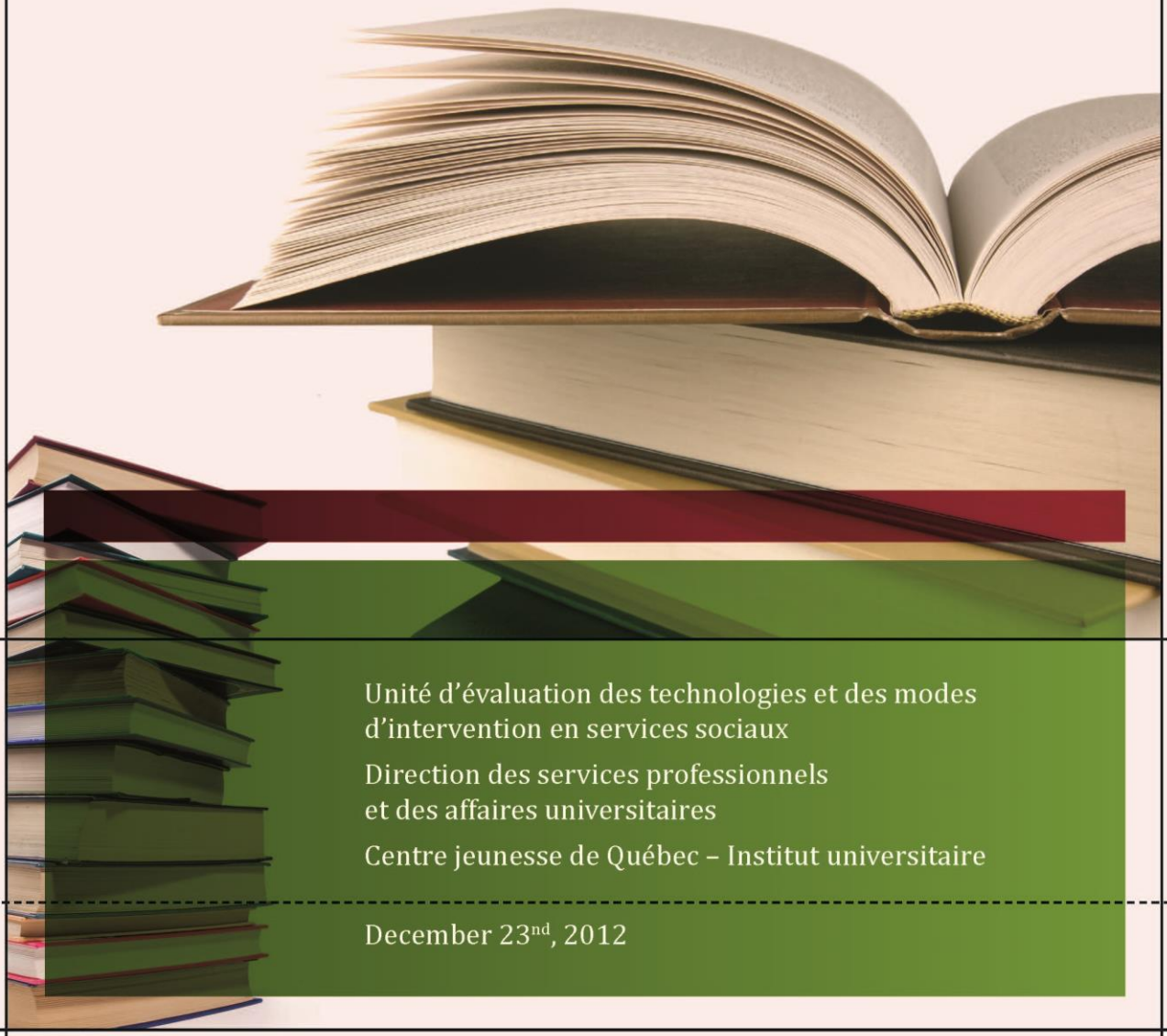

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