



RESTRAIL
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RESTRAIL

REduction of Suicides and Trespasses on RAILway property

Collaborative project

**Evaluation of measures, recommendations and
guidelines for further implementation**

Pilot test #2

Railway safety education programme – FFE

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RESTRAIL Consortium

List of Beneficiaries			
No	Beneficiary organisation name	Beneficiary short name	Country
1	Union Internationale des chemins de fer	UIC	FR
2	Teknologian Tutkimuskeskus VTT	VTT	FI
3	Trafikverket - TRV	TrV	SE
4	Institut français des sciences et technologies des transports, de l'aménagement et des réseaux	IFSTTAR	FR
5	MTRS3 Solutions and Services LTD	MTR	IL
6	Fundación CIDAUT, Fundación para la investigación y Desarrollo en Transporte y Energia	CIDAUT	ES
7	Helmholtz Zentrum München Deutsches Forschungszentrum für Gesundheit und Umwelt (GmbH)	HMGU	DE
8	Karlstad University	KAU	SE
9	Fundación de los Ferrocarriles Españoles	FFE	ES
10	Turkish State Railway Administration	TCDD	TK
11	Deutsche Bahn AG	DB	DE
12	Instytut Kolejnictwa	IK	PL
13	ProRail B.V	PR	NL
14	Nice Systems Ltd	NICE	IL
15	Ansaldo STS	ASTS	IT
16	University of Nottingham	UNOTT	UK
17	INFRABEL	INFRABEL	BE

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Acronym	Meaning
ADIF	ADministrador de Infraestructuras Ferroviarias
ERA	European Rail Agency
BTP	British Transport Police
CAEX	CAPital Expenditure
CBT	Computer Based Training
CCTV	Close-Circuit TeleVision
CN	Canadian National
DOW	Description Of Work
FFCCTV	Forward Facing Closed-Circuit TeleVision
GDL	German Drivers Leasing
HMTreasury	Her Majesty's Treasury
IM	Infrastructure Manager
IP	Important Point
IT	Information Technology
NPV	Net Present Value
OPEX	OPeration Expenditures
OTDR	On Train Data Recorder
PIER	Program in Interdisciplinary Education Research
2RProtect	Rail and Road Protect
RAILPOL	European Network of RAILway POLice Forces
RSSB	Rail Safety and Standards Board
RU	Railway Undertaking
SMIS	Safety Management Information System
SPSS	Statistical Package for the Social Sciences
STS	SysTemS
SWOV	Institute for Road Safety Research
TCRP	Transit Cooperative Research Programme
VAS	Visual Analogue Scale
VPC	Values of Preventing a Casualty
VT	Value of Time
CBA	Cost Benefit Analysis
CEA	Cost Effectiveness Analysis

1.1 Railway safety education programme – FFE

1.1.1 Overview of the piloted measure

The Railway Safety Education Programme worked with primary school children (aged 8 to 10 years) and primary school teachers, to raise awareness about the dangers and consequences of railway trespassing and how to be safe in the railway environment. The overall aim of the measure was to positively influence the behaviours and habits of children and young people towards acting safely around railways, preventing risky behaviour related to trespassing, thus reducing the possibility of accidents and incidents. The measure sought to achieve this aim through the following specific objectives:

- Develop attitudes about safety on trains and railways.
- Improve knowledge and awareness of safety on railway property, including the dangers and consequences of games and /or inappropriate activities on / near the tracks.
- Teach personal skills, such as awareness of danger/risk and safety on the tracks, how to be safe in railway environments and how to cross the tracks safely.

The programme comprised the delivery of railway safety workshops to both teachers and pupils between January and March. These took place at the two national railway museums in Spain (Madrid and Cataluña) and at three public primary schools in the city of Alicante. All participating schools are located close to a railway line and experience problems with railway trespassing.

The 8 - 10 year age group was selected in order to prepare this group with the safety skills that they will need for the next stage in their independent development. As teenagers the pupils will be more vulnerable to acting out high risk behaviour, such as railway trespassing, therefore intervening at an earlier age will help to shape attitudes that will influence safer behaviour in the future.

The measure worked with teachers and schools as a mechanism to reinforce the rail safety message to pupils. The involvement of teachers in delivering railway safety at school offers the chance to do prevention work in a continuous and sustained way, reaching a wide audience. In order for schools to act as delivery agents of railway safety education the measure had two key objectives:

- Create interest and awareness of the need to teach railway safety at schools.
- Provide knowledge and tools that enable teachers to have the confidence and capacity to teach railway safety at schools.

The FFE research team designed developed and delivered the rail safety workshops. The programme and workshop materials were based on an extensive review of existing railway safety education programmes and consultation with education and railway safety experts: Spanish Railway Museum learning teams, Autónoma University of Madrid Education Department, York National Railway Museum and British Transport Police, the Spanish Infrastructure Manager (ADIF) and Alicante City Council.

3.2.2 Methodology to evaluate the piloted measures

The focus of the evaluation is twofold to reflect the work carried out with the two beneficiary groups. On the one hand the evaluation has assessed the impact on teachers/schools and on the other hand the study has sought to measure the effects on the participating students. In addition to

the specific data collected for the two evaluations, monitoring data was gathered for both, summarized in **Table 1.1-1**.

Table 1.1-1: Monitoring data collected

Information	Teacher	Pupil
Number of schools engaged	✓	✓
Proximity of school to railway line	✓	✓
Number of activities delivered	✓	✓
Number of participants (age, sex)	✓	✓

Teacher Evaluation

In line with the objectives of the measure the evaluation aimed to assess the impact on teachers' attitudes, knowledge and skills. Specifically the following **indicators** were identified to measure effectiveness:

- Provision of rail and road safety education at the school: before and after participation;
- Perception of the importance of teaching railway safety and the dangers of railway trespassing: before and after participation;
- Level of confidence and capacity to teach railway safety at school: before and after participation;
- Level of satisfaction with teacher's workshop.

The study explored a mix of qualitative and quantitative information by employing a semi-structured (self-completion) questionnaire with a mix of open-ended and closed questions, in addition to Likert scales. In order to assess the impact of the Railway Safety Education Programme, a questionnaire was distributed at the end of the workshop session and a follow up questionnaire was sent 1-2 months after participation.

The analysis of the teacher's evaluation is structured under the four indicator headings outlined above. The questionnaire responses were translated from Spanish to English. The collected data was then cleansed and processed using Excel, before undergoing a descriptive analysis, within which the univariate analysis method was applied.

Responses to the open ended questions underwent a thematic analysis, by coding the answers under themed categories and then carrying out a univariate analysis of these themes. The analysis has been further enriched by the inclusion of verbatim quotes and qualitative (anecdotal) information captured from discussions generated during the workshop (translated from Spanish into English).

Please note, many of the questions sought to discover the impacts on individual teachers whilst others concerned practices at a school level. The analysis of the latter type of question has taken into account responses from all teachers, even though in a small number of cases contradictory responses were given by individual teachers from the same school. This may be explained by the degree of autonomy that individual teachers have in their classes.

In terms of the teacher sample, 7 educational centres participated in the workshops, comprising a total of 27 participants. Representatives from all educational centres completed the initial Teacher Evaluation (24 participants) and representatives from four of the educational centres completed the Teacher/School Follow up Evaluation (five participants).

Please note, due to the fact that not all participating organizations were schools, the respondents will be referred to as educational centres. Where relevant the data will be disaggregated to highlight responses from the specific organizations.

Pupil Evaluation

The evaluation of the pupils' workshops sought to gauge the change in the knowledge, attitudes and behaviour of the students regarding railway safety. The assessment of pupils' knowledge, attitudes and behaviour regarding crossing the railway tracks safely was evaluated at the beginning of the session (baseline) before starting the workshop and then again at the end of the workshop, in order to detect any change in attitude and knowledge.

The assessment was made using two evaluation activities. On the one hand, students were asked to help a character, named Daniela, get from her house to school by choosing between three possible routes. All paths involved having to cross a railway track, two of which included crossing the track in unauthorised and dangerous places and one option involved using a bridge. At the end of the workshop, in order to assess the knowledge acquisition of the pupils, this same exercise was repeated along with a series of true or false questions about the information presented in the workshop.

The results of the pupils' workshops have been analysed using descriptive analysis methods. On the one hand, a univariate analysis has been performed, using a confidence interval of 95% which describes the distribution, trend and dispersion of the single variables. A bivariate analysis has been used to examine the relationship between pairs of variables. The Pearson's Chi-square test has been carried out to test the relationship or independence of the variables examined. The analysis has been further enriched by the inclusion of qualitative (anecdotal) information captured from discussions generated during the workshop.

The data processing and statistical analysis of the results were performed using the SPSS statistical package for Windows and the data analysis programme Epidat 4.0. The database was created according to information collected in the questionnaire. The codification of the variables is determined by the design of the questionnaire.

The sample is based on the 271 pupils that participated in the pilot. Workshops were carried out with pupils from schools in the town of Vilanova i la Geltrú in Catalunya (n=99; 36.5%; C.I. 95%: 30.8-42.3), Alicante (n= 98; 26.9%; C.I. 95%: 30.4-41.9) and Madrid (n= 74; 27.3%; C.I. 95%: 22.0-32.6).

1.1.2 Evaluation results

Monitoring data

The **Table 1.1-2** summarizes the key monitoring data regarding participation in the Railway Safety Education Programme pilot collected for both types of workshops.

Table 1.1-2: Data of the Railway Safety Education Programme pilot.

Location	Participating Education Centres	Proximity to railway (metres) aprox	Workshops delivered		Number of participants		Pupil profile			
			T*	P*	T*	P*	Age (years)		Sex	
							8-9	9-10	Female	Male
Alicante	San Francisco de Asis Public Primary School	200 m	1	4	20	98	80	18	49	47
	Jose Carlos Aguilera Public Primary School	300 m								
	Gabriel Miró Public Primary School	5 m								
Cataluña	L'Arjau Public Primary School	100 m	1	3	7**	99	37	62	44	55
	Llebetx Public Primary School	100 m								
	Mataró Local Education Resource Centre	N/A								
	Cataluña Railway Museum learning team	20 m								
Madrid	Jorge Guillén Public Primary School	600 m	0	2	0	74	27	47	38	36
TOTAL	8		2	9	27	271	144	124	130	138

* T= teacher; P= pupil

** Five of the teacher workshop participants were members of educational staff from two different organizations: Cataluña Railway Museum Learning Team and Mataró Local Education Resource Centre.

As can be observed from the analysed data a total of 8 organizations participated in the pilot study, 6 of which were state primary schools. The other two, whilst not schools, have within their remit the delivery of educational activities to primary and secondary audiences¹. A total of 2 teacher and 9 pupil workshops were delivered with participation rates of 27 and 271 respectively.

¹ The Mataró Local Education Resource Centre is responsible for giving professional development support to teachers within its catchment. In this way it has knowledge of the curriculum provision of schools within the Mataró area and as such its questionnaire responses are representative of school practices. The inclusion of such an organization in the project is interesting due to its potential to reach a number of schools and disseminate railway safety work. It is also worth noting that the catchment area covered by this organization is different from that of the two schools that participated from Cataluña.

All of the participating schools are located in close proximity to a railway line (between 5 to 600 metres). Feedback provided by teachers in the evaluation forms and anecdotally suggests a link between the schools' interest in participating in the Railway Safety Education Programme and the proximity of their schools to railway infrastructure. This question is explored in more detail further on in this section.

Despite a difference in the number of schools that participated in each area (Alicante, Cataluña and Madrid) there was a similar rate of pupil participation from each location. With respect to the profile of the pupils, there were slightly more from the younger age bracket 8-9 yrs (4%) and marginally more males (1.5%).

Evaluation results: Teacher workshop

a. Railway safety education provision at schools before and after the pilot

When asked whether the school teaches children about road pedestrian safety all but two of the educational centres (i.e. the museum and one of the schools) gave an affirmative response (**Figure 1.1-1**)

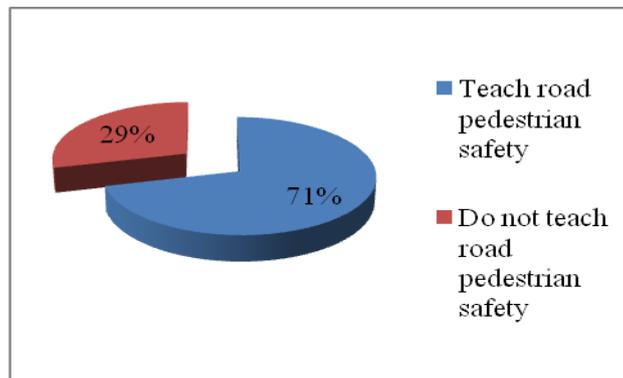


Figure 1.1-1: School provision of road pedestrian safety (%)

Of the schools, four out of five provide road pedestrian safety education. This provision is targeted at all year groups and consists in different activities, delivered both inside and out of school, with participation of external partners such as the local police.

In terms of inclusion of information about railway safety and/or the dangers of crossing the tracks², all except two respondents (from two different schools) stated that there is no railway safety content within this provision, as represented in **Figure 1.1-2**.

² The analysis of this question has only taken into account the responses given by the schools. On the one hand no response was provided by the railway museum and on the other hand the Mataró Local Education Resource Centre provided a non definite answer (i.e. they do not think that schools include railway safety within their road pedestrian safety provision at schools).

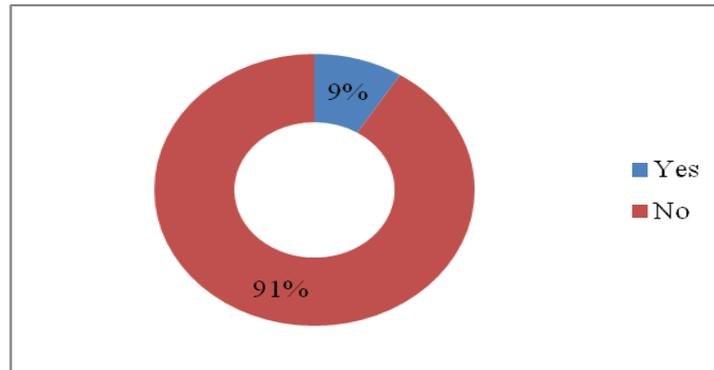


Figure 1.1-2: School provision of railway safety education (individual teacher responses) %

One of the teachers who teaches the dangers of railway trespassing reported that they did so by linking in with related subjects and by participating in initiatives such as RESTRAL or those run by organisations like Mapfre³. The other teacher did not specify how this subject is incorporated.

Despite the fact that the question relates to practice at a school level, the responses appear to report individual teaching practice. In this way, the fact that the vast majority of teachers reported that they did not include railway safety within road pedestrian safety teaching, suggests that these two respondents do so of their own volition as opposed to there being a systematic school approach to this topic.

In order to assess any changes to the schools' provision regarding railway safety education as a result of the pilot, in the follow up questionnaire teachers were asked whether they had delivered any further work since taking part in the workshop and whether there are plans to do so in the future.

Three out of four schools report that they have delivered some follow up work with their classes. This has included rail safety factsheets, stickers and diplomas; activities on the interactive white board; and further reflection on the subject and on the materials provided in the workshop.

Curiously the school that responded that they have not carried out any further work on the subject goes on to explain that "they have continued carrying out the planned activities". A response given to a previous question by the same respondent suggests that by "planned activities" they are referring to those related to railway safety education. In other words they have not delivered any additional activities as a consequence of having participated in the pilot because this is something they already have programmed.

In terms of the schools' intention to continue teaching railway safety education in the future, three out of four respondents stated their intention to do so. In all of the cases the teachers plan to incorporate these teachings within the curriculum subject "Conocimiento del Medio", a general studies subject which encompasses, amongst others, means of transport, human beings and health, physical environment, machines and equipment...

Other plans include the use of online resources and activities from different websites. One teacher also suggested the need to organise a meeting to discuss the issue and plan its incorporation within the school curriculum.

³ Mapfre is a trust belonging to an insurance company which develops a successful road pedestrian safety programme.

Despite the fact one of the schools responded “no” to this question, a response given to an earlier question suggests that they will indeed continue delivering railway safety education, due to the fact that this is already something covered by the school.

Incorporating the subject of railway safety within the school curriculum can ensure the continuity of the teachings. This does not exclude the value of carrying out specific activities such as rail safety workshops. Indeed one of the respondents expressed an opinion endorsing this approach, saying that the pupils often pay more attention when someone external delivers the activity.

Key findings:

- Based on the responses of the workshop participants there currently does not appear to be a systematic approach to delivering railway pedestrian safety at the schools.
- Despite a lack of current provision, evidence provided in the follow up questionnaire suggests that most of the schools that have participated in the pilot intend to deliver railway safety contents in the future, by incorporating learning within the school curriculum. Further evidence of the impact of the measure on teachers’ practice is the fact that some of the teachers have already carried out follow up work on the subject since their participation in the workshop.
- Taking into account the baseline situation the measure appears to have successful in encouraging teachers to adopt these teachings.

a. Perception of the importance of teaching railway safety at schools before and after the pilot

According to their questionnaire responses all participants consider it important to teach railway safety and the dangers of railway trespassing. This result is perhaps not too surprising given that all of the participating educational centres are located close to a railway and in areas where trespassing is common. Indeed the very fact of having signed up to the workshop indicates an awareness of the need for such an intervention.

In order to further explore perceptions regarding this problem, participants were asked to explain their answer. Given that the question was open, often more than one reason was cited. The responses given to this question (17 in total) have been grouped thematically and given a percentage frequency rating (see **Figure 1.1-3**). Some verbatim examples are listed by way of illustration.

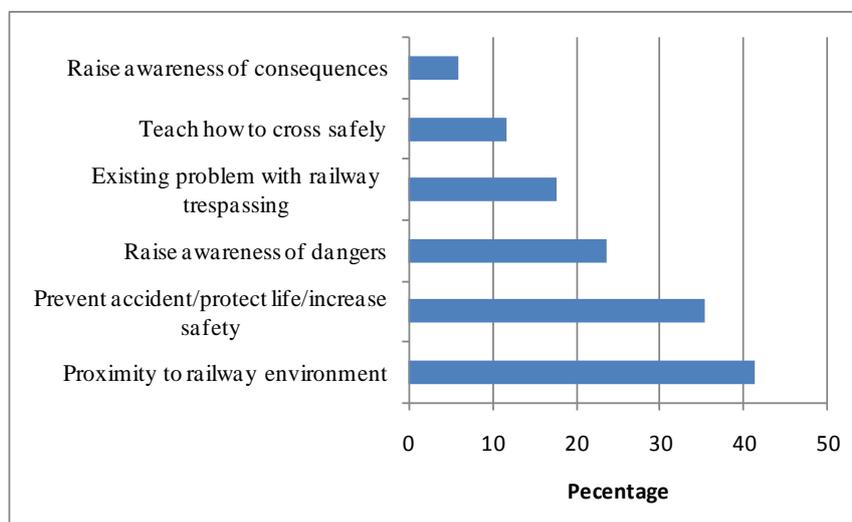




Figure 1.1-3: Reasons that it is important to teach pupils about railway safety and the dangers of trespassing on railway property

We can observe in **Figure 1.1-3** that the most important reason for teaching the pupils about the dangers of trespassing on railway property is due to their daily exposure to the railway environment. Just over 40% of the respondents talked about the closeness of the railway tracks to pupils' homes, school and the beach, indicating its importance in children's everyday life, as the following two verbatim quotes illustrate:

Another commonly quoted response (35%) was to teach railway safety in order to prevent accidents, protect life and increase safety.

Just under a quarter of the participants highlighted the need to teach pupils about the dangers of crossing the tracks, indicating a possible gap in the pupils' awareness of the risks involved.

Three of the teachers also mentioned that this issue should be dealt with as it is a reality for the pupils. For example, one of the teachers said "It's a current problem and one experienced by our school".

A further reason given by one teacher, which does not easily fit into the above categories, is that "railway safety should be dealt with in the same way as other safety issues such as road and air safety etc". This indicates the perception that as a safety issue, currently railway safety does not receive an adequate response. Despite the fact that people's exposure to the railway environment is less generalized than that of roads, for those communities where the railway punctuates their landscape and crossing the tracks forms a part of people's daily life, it is an issue of considerable importance.

Discussion generated through the workshop activities provided further anecdotal evidence on the subject. For example, in Alicante it was revealed that crossing the railway tracks in unauthorized places forms a part of many people's everyday lives and has done so for generations. In this way the workshop provided an interesting opportunity for people to reflect on an issue which is an everyday reality with new information regarding its dangers and consequences.

There were also anecdotal reports from the participants about railway trespassing incidents that had directly affected the school community. For example, in one of the schools (Cataluña) a pupil had been killed some years previously after playing on the railway tracks next to the school. Other cases of family members being involved in trespassing accidents were also recounted along with a number of stories about people crossing the tracks. One of the teachers in Cataluña highlighted a current problem their school is experiencing with teenage girls accessing the railway tracks to take "modelling" photos.

It is clear from their responses that the participants are aware of the railway trespassing issue, primarily because of their direct experience or exposure to the problem. Within a context where crossing the railway tracks is a daily habit, it is all the more interesting to discover whether a measure of this type has changed the perception of the phenomenon or made the participants more aware of the importance of dealing with the issue. To this end participants were asked whether their attitude about teaching railway safety at school has changed as a result of participating in this workshop, 16 responses were received to this open ended question, grouped into four categories, presented in **Figure 1.1-4** below.

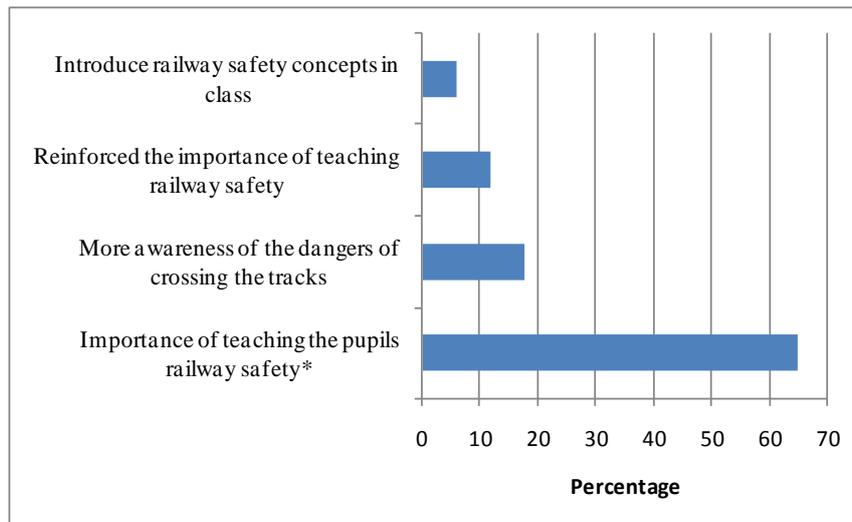


Figure 1.1-4: Change to attitude regarding teaching railway safety.

* This category includes the response "it's positive; although as is often the case (the intervention) comes late, always after an accident has occurred."

The overwhelming change reported was the increased importance the teachers now attribute to this issue which previously received little attention in class, as can be observed through the following quotes:

"It has made me reflect on this subject and see that it is important and it isn't something that we currently work on."

"I think it's important and I plan to introduce railway safety concepts to the pupils in my class."

"I think I should include it more often in my classes."

In some cases specific reasons were listed as to why it is considered important, for example:

"It forms part of the pupils' daily life so it is important to do prevention and awareness raising from a young age."

An indication of the impact of the measure is that despite the respondents' familiarity with the problem, attitudes appear to have changed with regards to their increased awareness of the dangers.

In the follow up questionnaire teachers were asked again whether their perception regarding the importance of teaching railway safety at school has changed as a result of taking part in the railway safety programme. Three out of five teachers gave an affirmative answer. Their responses included:

"We were already conscious of the importance of this issue due to the fact that our school is situated right next to a railway station and therefore a railway line, but the workshop has made us think about taking a more systematic approach to rail pedestrian safety at school."

"I thought that the children travelled little in train. All of the information, activities, workshops ... that help to protect and keep the pupils safe is very important."

“It is important to see the danger of crossing the railway tracks.”

In the case of the two schools who responded that their perception had not changed, one did recognize that their participation had served to reinforce the importance they place on this issue:

“For us the road pedestrian safety has always been very important. Maybe having carried out this activity has made us maintain this line of preventative work, given its importance.”

Key findings

- There is a strong awareness of the need to teach railway safety and the dangers of crossing the tracks amongst the participating education centres and a clear understanding as to why it is important. Specifically there appears to be a link between this awareness and the proximity of the educational centres to railway infrastructure and exposure to the problem, albeit there was not a control group⁴ to corroborate this theory.
- Despite their awareness of the importance of this issue, critically, it appears that participation in the pilot has led to teachers taking responsibility for putting these teachings into practice in their classrooms, with many reporting their commitment to introducing railway safety concepts within their teaching. This is evidence of the impact of the pilot, especially in a context where crossing the rail tracks is a daily habit for many people.

b. Confidence and capacity to teach railway safety at school before and after the pilot

In addition to understanding the teachers’ interest and disposition to teach railway safety education in their classrooms, the evaluation sought to assess their level of confidence and ability to do so, by asking them to rate their level of confidence and capacity on the scale of 1-5 (5 = very confident) before and after participating in the workshop⁵.

In order to assess the impact on the level of confidence and capacity, the difference between the rating before and after has been calculated for each teacher as an indicator of the degree of change. The results of the changes are summarized in **Table 1.1-3**.

Table 1.1-3: Change in the level of confidence and capacity

Degree of change (0-5): confidence / capacity level	Number of teachers (%)
0	1 (5.9%)
+1	4 (23.5%)

⁴ A school located in an area with little contact with the railway environment

⁵ Please note, in Cataluña information on the participants’ level of confidence before the workshop was not provided, as such an analysis of the change in their confidence and capacity to teach railway safety is not included in this analysis. The results relate only to teachers participating in the Alicante workshop.

+2	8 (47.1%)
+3	3 (17.6%)
+4	1 (5.9%)
+5	0 (0%)

All except one of the participants reported an increase in their level of confidence and capacity to teach railway safety education in their classrooms as a result of participating in the workshop. Just under half of the teachers (47%) experienced an increase of 2 points on the scale of confidence/capacity. Almost a fifth reported an increase of three points and for just under a quarter of the participants their level had gone up 1 point. Just one teacher reported no change (very confident before and after).

Key findings

- The participants' responses to this question clearly evidence the impact of the measure on teachers' confidence and ability to teach railway safety education.
- An increase in the confidence and skills of educators to teach children about railway safety as a result of taking part in the workshop indicates the effectiveness of the measure in terms of its potential to promote safe attitudes and behaviour in the railway environment.

c. Satisfaction with teacher's workshop and other feedback

A further measure of success of the pilot was to get feedback from the teachers regarding their level of satisfaction with the workshop. To this end, participants were asked to score their satisfaction on a scale of 1-5 (1=very unsatisfied, 5= very satisfied).

The results from this aspect of the evaluation demonstrate a high level of satisfaction with the workshop. From a total of 23 workshop participants who responded to this question, 69.6% gave the top satisfaction rating (5) and the remaining 30.4% rated their satisfaction as 4. In this way the total average satisfaction score was 4.7 out of a maximum score of 5.

1.1.3 Reported costs for measure

Reported costs for this measure implemented are given in **Table 1.1-4**.

Table 1.1-4: Costs for the implementation of railway safety education programme

Cost	Nature	value
Estimated Person Month costs allocated to the FFE research team to deliver Work Package 5 of the Restrail project		
Researchers	Personnel: Preparation of workshop materials (design and development). Workshop organisation and coordination tasks. Delivery of 11 workshops. Meeting attendance. Evaluation design, analysis and reporting.	40 837 €
	Travel expenses: Travel to deliver workshops in Cataluña Railway Museum, meeting and workshops in Alicante, meetings and workshop in Madrid.	5 200 €
	Indirect costs	24 502 €
Total		70 539 €
Costs of the non-monetary contributions of collaborating organizations (internal and external to the FFE) achieved through the contacts made by the FFE		

Museum staff (FFE)	Support development of educational workshop materials. Workshop organisation and coordination tasks. Meeting attendance. Participation in teacher and pupil workshop. Room hire. Time & effort (18h/4 members museum staff)	72 hours
Teachers[1]	Support organisation of workshops. Participation in teacher and pupil workshop and evaluation exercises. Time & effort (4h/22 teachers)	88 hours
Adif	Coordination tasks. Meeting attendance. Participation in workshops. Travel costs. Time & effort (10h/2 members of staff)	20 hours
Alicante Council	Coordination tasks. Meeting attendance. Time & effort (3h/3 members of staff)	9 hours
Autonoma University of Madrid	Support development of educational materials. Meeting attendance. Time & effort (2.5h/1 member of staff (professor))	2.5 hours
Total		191.5 hours

[1] According to sources from the Spanish Ministry of Education, Culture and Sport (2013) the average salary of a public primary school teacher is 27,325 euros per annum.

1.1.4 Evaluation results: Pupil workshop

a. Univariate analysis

As described previously, before starting the workshops an initial evaluation of the children's knowledge of railway safety and indication of behaviour was conducted. The participants were asked to help Daniela to get from her home to school by choosing from three possible routes (the correct way being Option 2).

From a total of 271 students who participated in the workshops, 269 gave a response to this question (non-response: 0.7%). The results indicate that children know where it is safer to cross train tracks with 97% choosing Option 2 (97%; C.I. 95%: 95-99.1), 1.1% respondents choosing Option 1 (C.I. 95%: -0.1-2.4) and the remaining 1.9% the Option 3 (C.I. 95%: 0.2-3.5) (**Table 1.1-5**).

Table 1.1-5: Pre-survey. Knowledge on railway safety

	Frequency	Percent	Valid Percent	CI (95%)
Option 1	3	1,1	1,1	-0,1-2,4
Option 2	261	96,3	97,0	95,0-99,1
Option 3	5	1,8	1,9	0,2-3,5
Total	269	99,3	100,0	
Non-response	2	0,7		
Total	271	100,0		

When asked, in plenary, about the reasons behind their choices, the children displayed awareness of the risks of being on the tracks, namely that it could result in accident or injury if hit by a train.

At the end of the workshop, in order to assess the knowledge acquisition of the pupils and an indication of behaviour change, this same exercise was repeated. A large number of students did not answer the question (n= 40; 14.8%). This is probably due to tiredness, lack of concentration as

a result of taking part in extracurricular activities and having received a lot of new information⁶. However, a higher percentage of pupils selected the correct answer (99.1%) (**Table 1.1-6**).

Table 1.1-6: Post-survey. Knowledge on railway safety

	Frequency	Percent	Valid Percent	CI (95%)
Option 1	2	0,74	0,87	-0,3-2,1
Option 2	229	84,50	99,13	...
Total	231	85,24	100,00	
Non-response	40	14,76		
Total	271	100,00		

Note: ... no commutable.

Relative to the knowledge gained in the workshop, the students had to complete a true or false questionnaire related to the issues presented.

First they were asked about characteristics of high speed trains. The results show that pupils know that high speed trains are faster than cars (98.1%; C.I. 95%: 96.5-99.8). Only 1.9% of respondents thought that cars were faster than high speed trains (C.I. 95%: 0.2-3.5) (**Table 1.1-7**).

Table 1.1-7: High speed trains are faster than a car

	Frequency	Percent	Valid Percent	CI (95%)
True	260	95,9	98,1	96,5-99,8
False	5	1,8	1,9	0,2-3,5
Total	265	97,8	100,0	
Non-response	6	2,2		
Total	271	100,0		

On the other hand, 97.3% of the students (257) answered that high speed trains are very fast and take a long time to stop (C.I. 95%: 95.4-99.3). From a total of 271 students who participated in the workshops 264 answered this question (non-response: 2.6%) (**Table 1.1-8**).

Table 1.1-8: High speed trains are very fast and take a long time to stop

	Frequency	Percent	Valid Percent	CI (95%)
True	257	94,8	97,3	95,4-99,3
False	5	1,8	1,9	0,2-3,5
Both	2	0,7	0,8	-0,3-1,8
Total	264	97,4	100,0	
Non-response	7	2,6		
Total	271	100,0		

⁶ In this regard it is important to take into account the ages of the children (8-10 years old).

92.1% of the pupils answered that if you are on the railway track and see a train coming the train has no time to stop (C.I. 95%: 88.8-95.3) and 7.9% said the opposite (C.I. 95%: 4.7-11.2) (**Table 1.1-9**).

Table 1.1-9: If you are on the railway track and see a train coming, the train has time to stop

	Frequency	Percent	Valid Percent	CI (95%)
True	21	7,7	7,9	4,7-11,2
False	244	90,0	92,1	88,8-95,3
Total	265	97,8	100,0	
Non-response	6	2,2		
Total	271	100,0		

38% of the students answered that trains are always noisy and so it is easy to hear when they are coming down the track or into the station (C.I. 95%: 34.2-43.9) while 53.2% said that it is false (C.I. 95%: 47.2-59.3) and 8.7% selected both answers (true and false) (C.I. 95%: -5.3-12.2) (**Table 1.1-10**).

Table 1.1-10: Trains are always noisy and so it's easy to hear when they are coming down the track or into the station

	Frequency	Percent	Valid Percent	CI (95%)
True	100	36,9	38,0	32,2-43,9
False	140	51,7	53,2	47,2-59,3
Both	23	8,5	8,7	5,3-12,2
Total	263	97,0	100,0	
Non-response	8	3,0		
Total	271	100,0		

Another question concerned who is allowed to cross the railway tracks. Students were informed that no one can cross the tracks. In some cases the children asked if in emergency situations people such as police or firefighters are permitted to cross the railway tracks, to which it was responded that in those situations it is possible with the application of special safety measures and regulations. It was however insisted upon that it is forbidden for anyone to cross the railway tracks. 95.8% of the students answered that firefighters cannot cross the railway tracks (n= 254; C.I. 95%: 93.4-98.3), 3.4% answered that they can cross it (C.I. 95%: 1.2-5.6) and 0.8% that firefighters can cross in some situations (C.I. 95%: 0.3-1.8) (**Table 1.1-11**).

Table 1.1-11: Firefighters are allowed to cross the railway tracks

	Frequency	Percent	Valid Percent	CI (95%)
True	9	3,3	3,4	1,2-5,6
False	254	93,7	95,8	93,4-98,3
Both	2	0,7	0,8	0,3-1,8
Total	265	97,8	100,0	
Non-response	6	2,2		
Total	271	100,0		

With regards to this issue students were further asked if it is true or false that people are allowed to cross railway tracks. 94% answered that is false (C.I. 95%: 91.1-96.8) and 6% that is true (3.2-8.9) (**Table 1.1-12**). The emphasis on this issue derives from the importance of this concept within the workshop.

Table 1.1-12: People are allowed to cross railway tracks

	Frequency	Percent	Valid Percent	CI (95%)
True	16	5,9	6,0	3,2-8,9
False	249	91,9	94,0	91,1-96,8
Total	265	97,8	100,0	
Non-response	6	2,2		
Total	271	100,0		

In the workshops children were also informed about how they must behave in railway stations. Regarding the question: you are not allowed to cross the yellow line near the platform edge, 85.7% of the pupils answered that it is not allowed (n= 227; C.I. 95%: 85.7-89.9) (**Table 1.1-13**).

Table 1.1-13: You are not allowed to cross the yellow line on the platform

	Frequency	Percent	Valid Percent	CI (95%)
True	227	83,8	85,7	81,4-89,9
False	37	13,7	14,0	9,8-18,1
Both	1	0,4	0,4	-0,4-1,1
Total	265	97,8	100,0	
Non-response	6	2,2		
Total	271	100,0		

84.2% of the students answered that you should not listen to music with headphones/earphones in railway stations (C.I. 95%: 79.8-88.5), 15.1% said that you can (C.I. 95%: 10.8-19.4) and the 0.8% they selected both answers (true and false) (C.I. 95%: -0.3-1.8) (**Table 1.1-14**).

Table 1.1-14: You should not listen to music with headphones/earphones at a train station because it may stop you from hearing the train coming and from hearing the warning messages

	Frequency	Percent	Valid Percent	CI (95%)
True	223	82,3	84,2	79,8-88,5
False	40	14,8	15,1	10,8-19,4
Both	2	0,7	0,8	-0,3-1,8
Total	265	97,8	100,0	
Non-response	6	2,2		
Total	271	100,0		

Another question asked about whether you are allowed to throw balls onto the track. From a total of 271 students who participated in the workshops 263 answered this question (non-response:

3%). 90.9% of pupils said that is false (C.I. 95%: 87.4-94.4) and 9.1% that is true (C.I. 95%: 5.6-12.6) (Table 1.1-15).

Table 1.1-15: You are allowed to throw balls onto the track

	Frequency	Percent	Valid Percent	CI (95%)
True	24	8,9	9,1	5,6-12,6
False	239	88,2	90,9	87,4-94,4
Total	263	97,0	100,0	
Non-response	8	3,0		
Total	271	100,0		

b. Bivariate analysis

A bivariate analysis was undertaken to examine the relationship between pairs of variables.

- **Location**

The relation between location of the school and the participants' knowledge of railway safety was analysed. All of the schools that participated are located in close proximity to a railway track and have exposure to the problem of railway trespassing in their community. However, there are differences between cities and, for example, in Alicante there have been several accidents recently caused by railway trespassing.

Table 1.1-16 summarises the association between place of residence and the results of the pre and post-survey. 98% of Vilanova I la Geltrú's students chose Option 2 in the Pre-survey, 100% of Madrid's pupils and the 93,8% of Alicante's students ($p > 0.05$). In the Post-survey a 100% of Vilanova I la Geltrú's students selected Option 2, 96.9% from Madrid's pupils and 99.1% from Alicante's students ($p > 0.05$).

The results indicate an improvement in the knowledge of pupils from Alicante and a worsening in the case of Madrid. However, in Alicante the improvement in pupils' knowledge is more marked than the worsening of that amongst the children in Madrid (6.2 percentage points vs. 3.1 percentage points).

Table 1.1-16: Knowledge on railway safety by location

		City								p-value
		Vilanova i la Geltrú		Madrid		Alicante		Total		
		n	%	n	%	n	%	n	%	
Pre-survey	Option 1	0	0,0%	0	0,0%	3	3,1%	3	1,1%	0,105
	Option 2	97	98,0%	73	100,0%	91	93,8%	261	97,0%	
	Option 3	2	2,0%	0	0,0%	3	3,1%	5	1,9%	
	Total	99	100,0%	73	100,0%	97	100,0%	269	100,0%	
Post-survey	Option 1	0	0,0%	2	3,1%	0	0,0%	2	0,9%	0,076
	Option 2	75	100,0%	63	96,9%	91	100,0%	229	99,1%	
	Option 3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	
	Total	75	100,0%	65	100,0%	91	100,0%	231	100,0%	

Students from Vilanova i la Geltrú gave slightly more correct responses to the following questions when compared to schools from the other two cities: if you are on the railway track and see a train coming, the train has time to stop (93.5% vs. 90.5% in Madrid and 91.8 in Alicante; $p>0.05$); you are not allowed to cross the yellow line on the platform (87.1% vs. 86.5% in Madrid and 83.7% in Alicante; $p>0.05$); you should not listen to music with headphones/earphones at a train station because it may stop you from hearing the train coming and from hearing the warning messages (88.2% vs. 81.1% in Madrid and 82.7% in Alicante; $p> 0.05$).

Students from Madrid gave a slightly more correct responses to the following questions when compared to schools from the other two cities: high speed trains are faster than a car (100% vs. 97.8% in Vilanova i la Geltrú and 96.9 in Alicante; $p>0.05$); firefighters are allowed to cross the railway tracks (98.6% vs. 93.5% in Vilanova i la Geltrú and 95.9% in Alicante; $p>0.05$); you are allowed to throw balls onto the track (93.2% vs. 91.3% in Vilanova i la Geltrú and 88.8% in Alicante; $p> 0.05$ (Table 1.1-17).

Finally, students from Alicante gave slightly more correct responses to the following questions when compared to schools from the other two cities: high speed trains are very fast and take a long time to stop (100% vs. 95.7% in Vilanova i la Geltrú and 95.9 in Madrid; $p>0.05$); trains are always noisy and so it's easy to hear when they are coming down the track or into the station (72.4% vs. 48.4% in Vilanova i la Geltrú and 33.8% in Madrid; $p<0.05$); people are allowed to cross railway tracks (96.9% vs. 90.3% in Vilanova i la Geltrú and 94.6% in Madrid; $p> 0.05$) (**Table 1.1-17**).

Table 1.1-17: Knowledge gained in the workshop by city

		City								p-value
		Vilanova i la Geltrú		Madrid		Alicante		Total		
		n	%	n	%	n	%	n	%	
High speed trains are faster than a car	True	91	97,8%	74	100,0%	95	96,9%	260	98,1%	0,335
	False	2	2,2%	0	0,0%	3	3,1%	5	1,9%	
	Total	93	100,0%	74	100,0%	98	100,0%	265	100,0%	
High speed trains are very fast and take a long time to stop	True	89	95,7%	71	95,9%	97	100,0%	257	97,3%	0,370
	False	3	3,2%	2	2,7%	0	0,0%	5	1,9%	
	Both	1	1,1%	1	1,4%	0	0,0%	2	0,8%	
If you are on the railway track and see a train coming, the train has time to stop	True	6	6,5%	7	9,5%	8	8,2%	21	7,9%	0,770
	False	87	93,5%	67	90,5%	90	91,8%	244	92,1%	
	Total	93	100,0%	74	100,0%	98	100,0%	265	100,0%	
Trains are always noisy and so it's easy to hear when they are coming down the track or into the station	True	38	41,8%	37	50,0%	25	25,5%	100	38,0%	0,000
	False	44	48,4%	25	33,8%	71	72,4%	140	53,2%	
	Both	9	9,9%	12	16,2%	2	2,0%	23	8,7%	
Firefighters are allowed to cross the railway tracks	True	5	5,4%	0	0,0%	4	4,1%	9	3,4%	0,282
	False	87	93,5%	73	98,6%	94	95,9%	254	95,8%	
	Both	1	1,1%	1	1,4%	0	0,0%	2	0,8%	
People are allowed to cross railway tracks	True	9	9,7%	4	5,4%	3	3,1%	16	6,0%	0,153
	False	84	90,3%	70	94,6%	95	96,9%	249	94,0%	
	Total	93	100,0%	74	100,0%	98	100,0%	265	100,0%	
You are not allowed to cross the yellow line on the platform	True	81	87,1%	64	86,5%	82	83,7%	227	85,7%	0,738
	False	12	12,9%	10	13,5%	15	15,3%	37	14,0%	
	Both	0	0,0%	0	0,0%	1	1,0%	1	0,4%	
You should not listen to music with headphones/earphones at a train station because it may stop you from hearing the train coming and from hearing the warning messages	True	82	88,2%	60	81,1%	81	82,7%	223	84,2%	0,280
	False	11	11,8%	14	18,9%	15	15,3%	40	15,1%	
	Both	0	0,0%	0	0,0%	2	2,0%	2	0,8%	
You are allowed to throw balls onto the track	True	8	8,7%	5	6,8%	11	11,2%	24	9,1%	0,607
	False	84	91,3%	68	93,2%	87	88,8%	239	90,9%	
	Total	92	100,0%	73	100,0%	98	100,0%	263	100,0%	

▪ **School**

The evaluation also sought to identify whether there is an association between the school and knowledge on railway safety. All of the schools that participated are located in close proximity to a railway track. However, there are differences in the distance to the train tracks. For example, Gabriel Miró Public Primary school is located within approximately 5 metres of the railway track (closest of all schools) whilst Jorge Guillén Public Primary school in Madrid is located some 600 metres (furthest away of all schools).

Table 1.1-18 summarises the linkage between school and the results of the pre-survey and post-survey. This shows that the lower percentages of success in the pre-survey are found in San Francisco de Asís Public Primary school and Gabriel Miró school (91.7% and 92.3%; $p > 0.05$)⁷. In the post-survey 100% of the pupils matched the correct answer in all schools except Jorge Guillén Public Primary school in Madrid (96.9%; $p > 0.05$).

⁷ San Francisco de Asís Public Primary School, is located within approximately 200 metres of the railway track. Gabriel Miró Public Primary school is located within approximately 5 metres of the railway track.

In this way the results indicate an improvement in the knowledge of pupils, except for those from Jorge Guillén Public Primary school (Madrid). Interestingly, in the case of Jorge Guillén school their pre to post survey responses show a worsening of knowledge, from 100% of the pupils providing a correct answer to the pre-survey to 96.9% ($p>0.05$) responding correctly to the post-survey. This could be an indication of the effectiveness of the measure; however it would be inconsistent with their results from other parts of their evaluation. In all likelihood this result is probably due to fatigue, lack of concentration, the new information and the place⁸.

However, it may still be worth highlighting that of all the participating schools Jorge Guillén is the furthest away from the railway tracks and therefore the pupils' experience of the railway environment may not be as common compared to the other schools.

Table 1.1-18: Knowledge on railway safety by school

		Public Primary school														
		Escola Arjau		Escola Llebext		Jorge Guillén		Gabriel Miró		Jose Carlos Aguilera		San Francisco de Asís		Total		p-value
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Pre-survey	Option 1	0	0,0%	0	0,0%	0	0,0%	1	2,6%	1	2,9%	1	4,2%	3	1,1%	0,313
	Option 2	72	97,3%	25	100,0%	73	100,0%	36	92,3%	33	97,1%	22	91,7%	261	97,0%	
	Option 3	2	2,7%	0	0,0%	0	0,0%	2	5,1%	0	0,0%	1	4,2%	5	1,9%	
	Total	74	100,0%	25	100,0%	73	100,0%	39	100,0%	34	100,0%	24	100,0%	269	100,0%	
Post-survey	Option 1	0	0,0%	0	0,0%	2	3,1%	0	0,0%	0	0,0%	0	0,0%	2	0,9%	0,398
	Option 2	58	100,0%	17	100,0%	63	96,9%	35	100,0%	33	100,0%	23	100,0%	229	99,1%	
	Option 3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	0	0,0%	
	Total	58	100,0%	17	100,0%	65	100,0%	35	100,0%	33	100,0%	23	100,0%	231	100,0%	

Table 1.1-19 summarises the association between school and the knowledge gained in the workshop. The schools with the fewest correct answers are:

- Gabriel Miró Public Primary school from Alicante: high speed trains are faster than a car (92.3%; $p>0.05$); if you are on the railway track and see a train coming, the train has time to stop (89.7%; $p>0.05$); you are not allowed to cross the yellow line on the platform (79.5%; $p>0.05$).
- Escola Arjau Public Primary school from Vilanova i la Geltrú: high speed trains are very fast and take a long time to stop (95.6%; $p>0.05$); firefighters are allowed to cross the railway tracks (91.2%; $p>0.05$); people are allowed to cross railway tracks (88.2%; $p>0.05$).
- San Francisco de Asís Public Primary school from Alicante: you should not listen to headphones/earphones at a train station because it may stop you from hearing the train coming and from hearing the warning messages (79.2%; $p>0.05$); you are allowed to throw balls onto the track (83.3%; $p>0.05$).

Table 1.1-19: Knowledge gained in the workshop by school

⁸ Madrid Railway Museum as an unfamiliar surrounding may have a distracting effect on the pupils.

Public Primary school															p-value	
		Escola Arjau		Escola Llebest		Jorge Guillén		Gabriel Miró		Jose Carlos Aguilera		San Francisco de Asis		Total		
		n	%	n	%	n	%	n	%	n	%	n	%	n		%
High speed trains are faster than a car	True	66	97,1%	25	100,0%	74	100,0%	36	92,3%	35	100,0%	24	100,0%	260	98,1%	0,061
	False	2	2,9%	0	0,0%	0	0,0%	3	7,7%	0	0,0%	0	0,0%	5	1,9%	
	Total	68	100,0%	25	100,0%	74	100,0%	39	100,0%	35	100,0%	24	100,0%	265	100,0%	
High speed trains are very fast and take a long time to stop	True	65	95,6%	24	96,0%	71	95,9%	38	100,0%	35	100,0%	24	100,0%	257	97,3%	0,897
	False	2	2,9%	1	4,0%	2	2,7%	0	0,0%	0	0,0%	0	0,0%	5	1,9%	
	Both	1	1,5%	0	0,0%	1	1,4%	0	0,0%	0	0,0%	0	0,0%	2	0,8%	
Total	68	100,0%	25	100,0%	74	100,0%	38	100,0%	35	100,0%	24	100,0%	264	100,0%		
If you are on the railway track and see a train coming, the train has time to stop	True	5	7,4%	1	4,0%	7	9,5%	4	10,3%	2	5,7%	2	8,3%	21	7,9%	0,932
	False	63	92,6%	24	96,0%	67	90,5%	35	89,7%	33	94,3%	22	91,7%	244	92,1%	
	Total	68	100,0%	25	100,0%	74	100,0%	39	100,0%	35	100,0%	24	100,0%	265	100,0%	
Trains are always noisy and so it's easy to hear when they are coming down the track or into the station	True	33	50,0%	5	20,0%	37	50,0%	13	33,3%	7	20,0%	5	20,8%	100	38,0%	0,000
	False	26	39,4%	18	72,0%	25	33,8%	25	64,1%	28	80,0%	18	75,0%	140	53,2%	
	Both	7	10,6%	2	8,0%	12	16,2%	1	2,6%	0	0,0%	1	4,2%	23	8,7%	
Total	66	100,0%	25	100,0%	74	100,0%	39	100,0%	35	100,0%	24	100,0%	263	100,0%		
Firefighters are allowed to cross the railway tracks	True	5	7,4%	0	0,0%	0	0,0%	2	5,1%	0	0,0%	2	8,3%	9	3,4%	0,294
	False	62	91,2%	25	100,0%	73	98,6%	37	94,9%	35	100,0%	22	91,7%	254	95,8%	
	Both	1	1,5%	0	0,0%	1	1,4%	0	0,0%	0	0,0%	0	0,0%	2	0,8%	
Total	68	100,0%	25	100,0%	74	100,0%	39	100,0%	35	100,0%	24	100,0%	265	100,0%		
People are allowed to cross railway tracks	True	8	11,8%	1	4,0%	4	5,4%	1	2,6%	1	2,9%	1	4,2%	16	6,0%	0,329
	False	60	88,2%	24	96,0%	70	94,6%	38	97,4%	34	97,1%	23	95,8%	249	94,0%	
	Total	68	100,0%	25	100,0%	74	100,0%	39	100,0%	35	100,0%	24	100,0%	265	100,0%	
You are not allowed to cross the yellow line on the platform	True	56	82,4%	25	100,0%	64	86,5%	31	79,5%	30	85,7%	21	87,5%	227	85,7%	0,333
	False	12	17,6%	0	0,0%	10	13,5%	7	17,9%	5	14,3%	3	12,5%	37	14,0%	
	Both	0	0,0%	0	0,0%	0	0,0%	1	2,6%	0	0,0%	0	0,0%	1	0,4%	
Total	68	100,0%	25	100,0%	74	100,0%	39	100,0%	35	100,0%	24	100,0%	265	100,0%		
You should not listen to music with headphones/earphones at a train station because it may stop you from hearing the train coming and from hearing the warning messages	True	58	85,3%	24	96,0%	60	81,1%	31	79,5%	31	88,6%	19	79,2%	223	84,2%	0,246
	False	10	14,7%	1	4,0%	14	18,9%	8	20,5%	3	8,6%	4	16,7%	40	15,1%	
	Both	0	0,0%	0	0,0%	0	0,0%	0	0,0%	1	2,9%	1	4,2%	2	0,8%	
Total	68	100,0%	25	100,0%	74	100,0%	39	100,0%	35	100,0%	24	100,0%	265	100,0%		
You are allowed to throw balls onto the track	True	8	11,9%	0	0,0%	5	6,8%	4	10,3%	3	8,6%	4	16,7%	24	9,1%	0,377
	False	59	88,1%	25	100,0%	68	93,2%	35	89,7%	32	91,4%	20	83,3%	239	90,9%	
	Total	67	100,0%	25	100,0%	73	100,0%	39	100,0%	35	100,0%	24	100,0%	263	100,0%	

Whilst all schools demonstrate a good level of knowledge regarding where it is safe to cross the tracks, the results suggest that the schools that are closer to the railway tracks, such as Gabriel Miro from Alicante and Escola Arjau from Vilanova i la Geltrú, have relatively less knowledge about railway safety. In the communities where these schools are located, the railway track and railway station are part of everyday life. In this way one possible explanation is that the pupils' knowledge depends on the socially accepted behaviour of the family, friends and neighbours around them and therefore their knowledge may be confused by the risky behaviour they observe in these adults. Overall however, the good level of knowledge demonstrated by students' responses to the evaluation activities indicates the effectiveness of the measure in terms of knowledge about railway safety following participation in the workshop.

▪ **Grade**

In order to analyse the influence of the age (Grade) on railway safety knowledge a statistical analysis linking these variables has been performed.

Students from Grade 3 and 4 (8-10 years old) took part in the workshop. As previously mentioned, in Jose Carlos Aguilera Primary Public school pupils from Grade 3 and 4 participated in the workshop together. The survey was completed anonymously so it is not possible to determine the age or grade of the students, for this reason, there is a category for "Grade 3 & 4" (n=34).

The results indicate that Grade 4 students have more knowledge about where you have to cross the railway tracks. In addition, the post-survey demonstrated an improvement in their knowledge following participation in the workshop. **Table 1.1-20** summarizes the association between grade and the results of the pre-survey and post-survey. 96% (n= 121) of Grade 3 pupils selected the right answer (Option 2) in the pre-survey and 98.2% (n= 107) of pupils from Grade 4 (p>0.05). In the post-survey 98.2% of the pupils from Grade 3 chose the correct answer and 100% of the pupils from Grade 4 (p>0.05).

Table 1.1-20: Knowledge on railway safety by Grade

		Grade								p-value
		Grade 3		Grade 4		Grade 3 & 4		Total		
		n	%	n	%	n	%	n	%	
Pre-survey	Option 1	2	1,6%	0	0,0%	1	2,9%	3	1,1%	0,504
	Option 2	121	96,0%	107	98,2%	33	97,1%	261	97,0%	
	Option 3	3	2,4%	2	1,8%	0	0,0%	5	1,9%	
	Total	126	100,0%	109	100,0%	34	100,0%	269	100,0%	
Post-survey	Option 1	2	1,8%	0	0,0%	0	0,0%	2	0,9%	0,349
	Option 2	111	98,2%	85	100,0%	33	100,0%	229	99,1%	
	Option 3	0	0,0%	0	0,0%	0	0,0%	0	0,0%	
	Total	113	100,0%	85	100,0%	33	100,0%	231	100,0%	

In addition, **Table 1.1-21** presents the association between Grade and the knowledge gained in the workshop.



Table 1.1-21: Knowledge gained in the workshop by Grade

		Grade 3		Grade 4		Grade 3 & 4		Total		p-value
		n	%	n	%	n	%	n	%	
High speed trains are faster than a car	True	116	95,9%	109	100,0%	35	100,0%	260	98,1%	0,048
	False	5	4,1%	0	0,0%	0	0,0%	5	1,9%	
	Total	121	100,0%	109	100,0%	35	100,0%	265	100,0%	
High speed trains are very fast and take a long time to stop	True	117	97,5%	105	96,3%	35	100,0%	257	97,3%	0,437
	False	3	2,5%	2	1,8%	0	0,0%	5	1,9%	
	Both	0	0,0%	2	1,8%	0	0,0%	2	0,8%	
	Total	120	100,0%	109	100,0%	35	100,0%	264	100,0%	
If you are on the railway track and see a train coming, the train has time to stop	True	13	10,7%	6	5,5%	2	5,7%	21	7,9%	0,297
	False	108	89,3%	103	94,5%	33	94,3%	244	92,1%	
	Total	121	100,0%	109	100,0%	35	100,0%	265	100,0%	
Trains are always noisy and so it's easy to hear when they are coming down the track or into the station	True	51	42,5%	42	38,9%	7	20,0%	100	38,0%	0,000
	False	64	53,3%	48	44,4%	28	80,0%	140	53,2%	
	Both	5	4,2%	18	16,7%	0	0,0%	23	8,7%	
	Total	120	100,0%	108	100,0%	35	100,0%	263	100,0%	
Firefighters are allowed to cross the railway tracks	True	9	7,4%	0	0,0%	0	0,0%	9	3,4%	0,008
	False	112	92,6%	107	98,2%	35	100,0%	254	95,8%	
	Both	0	0,0%	2	1,8%	0	0,0%	2	0,8%	
	Total	121	100,0%	109	100,0%	35	100,0%	265	100,0%	
People are allowed to cross railway tracks	True	8	6,6%	7	6,4%	1	2,9%	16	6,0%	0,697
	False	113	93,4%	102	93,6%	34	97,1%	249	94,0%	
	Total	121	100,0%	109	100,0%	35	100,0%	265	100,0%	
You are not allowed to cross the yellow line on the platform	True	99	81,8%	98	89,9%	30	85,7%	227	85,7%	0,434
	False	21	17,4%	11	10,1%	5	14,3%	37	14,0%	
	Both	1	0,8%	0	0,0%	0	0,0%	1	0,4%	
	Total	121	100,0%	109	100,0%	35	100,0%	265	100,0%	
You should not listen to music with headphones/earphones at a train station because it may stop you from hearing the train coming and from hearing the warning messages	True	95	78,5%	97	89,0%	31	88,6%	223	84,2%	0,078
	False	25	20,7%	12	11,0%	3	8,6%	40	15,1%	
	Both	1	0,8%	0	0,0%	1	2,9%	2	0,8%	
	Total	121	100,0%	109	100,0%	35	100,0%	265	100,0%	
You are allowed to throw balls onto the track	True	15	12,4%	6	5,6%	3	8,6%	24	9,1%	0,205
	False	106	87,6%	101	94,4%	32	91,4%	239	90,9%	
	Total	121	100,0%	107	100,0%	35	100,0%	263	100,0%	

The results show that the students from Grade 4 have more knowledge about railway safety in the workshops: high speed trains are faster than a car (100%; $p < 0.05$); if you are on the railway track and see a train coming, the train has time to stop (94.5%; $p > 0.05$); firefighters are allowed to cross the railway tracks (98.2%; $p < 0.05$); people are allowed to cross railway tracks (93.6%; $p > 0.05$); you are not allowed to cross the yellow line on the platform (89.9%; $p > 0.05$); you should not listen to music with headphones/earphones at a train station because it may stop you from hearing the train coming and from hearing the warning messages (89%; $p > 0.05$); you are allowed to throw balls onto the track (94.4%; $p > 0.05$).

On the other hand, Grade 3 students selected more right answers regarding the following: high speed trains are very fast and take a long time to stop (97.5%; $p > 0.05$); trains are always noisy and so it's easy to hear when they are coming down the track or into the station (53.3%; $p < 0.05$). These results are logical (older children know more). However, the values for both courses are similar. This indicates that the selection of this age group was appropriate in terms of the participants acquiring new knowledge. This was confirmed anecdotally by some of the teachers who spoke about how this age group absorbs knowledge easily, albeit teachers also expressed a demand to work with older children, particularly teenagers who are seen to be at higher risk of crossing the tracks.

c. Anecdotal evidence from pupils

All of the workshops were characterized by the active participation of the pupils, in which comments, reflections and experiences regarding the issues under discussion were frequently volunteered. These comments provide some anecdotal information regarding the students' attitudes and behavior in relation to railway safety and reflect the reality of railway trespassing in the community where these pupils live and go to school.

This feedback demonstrated that a number of pupils have personally crossed the railway tracks in unauthorized places and/or know people that have done so. For example, in one of the schools a boy talked about having sat on the railway tracks with friends whilst watching a firework display. He said it was safe due to it being night time (therefore not so many trains passing). Other displays of risky attitudes included a comment defending crossing the tracks by saying "you can be lucky". Indeed in many cases the pupils need to cross the tracks everyday to get from their home to school. In some cases this involves crossing the tracks in unauthorized places. There were also examples of pupils talking about railway trespassing accidents that had affected people they know.

A further source of evidence regarding the pupils' baseline knowledge and awareness of the risks of railway trespassing was gauged when voting for the correct answer in the quiz. Pupils' responses were noted down by the researchers, although due to the pace of the activity it was not possible to record these results systematically and as such cannot form part of a rigorous analysis. However, anecdotally it is possible to report some patterns that emerged regarding pupils pre-knowledge of the risks of crossing the tracks.

In general pupils appeared to have awareness of the speed of high-speed trains relative to other things, such as a car or a cheetah. There was a lesser degree of certainty regarding pupils' awareness of the weight of trains when compared to a herd of 40 elephants or a blue whale. There was far less awareness regarding the stopping distance required by trains in all of the workshops, with few pupils voting for the correct answer (10 football fields), rather underestimating the distance required for the train to brake.

Following the presentation of the information, it became clear that the pupils were gaining an understanding of the risks of railway trespassing. They were able to apply the information by explaining why it is dangerous to be on or near the tracks and act unsafely in the station. For example, during the discussion about behaving safely in the station one pupil commented “if you went to pick up the teddy bear from the tracks a train could suddenly appear”. This comment demonstrates an understanding of the risks by understanding that the speed, weight, stopping distance and silence of some trains can result in a train suddenly appearing, leaving no time for the person to move off the tracks and avoid an accident.

A question was included in the post teacher/school evaluation regarding any feedback or comments made by the pupils in class following their participation in the workshop. Three out of five teachers reported that pupils had made reflections following the workshop. These included:

- One teacher noted that the pupils had reflected on following points covered in the workshop:
 - *Breaking distance*
 - *Speed of trains compared to animals*
 - *The volume of trains*
- *The students talked about their experiences and anecdotes... journeys they have made in trains or when they have waited for family members or friends in the station. They did not talk about crossing the railway tracks, perhaps because of their young age.*
- *They think the tracks should be put underground.*

d. Key findings

- The results of the evaluation exercises, together with evidence collected through the researchers’ observations, demonstrate the pupils’ comprehension of the information presented and the awareness generated about the risks of crossing the tracks and acting unsafely in stations.
- This evidence indicates that the students have acquired knowledge regarding risk factors related to the speed; weight and stopping distance of trains and was able to explain the potential repercussions of these factors for someone on or near the tracks.
- Most pupils also understood the illegality of crossing the tracks, although there was slightly less awareness concerning the application of safety rules within stations, specifically crossing the yellow line on the platform edge and risks of listening to music with headphones/earphones at a train station.
- The measure appears to have been effective, with evidence that the students have:
 - Developed safer attitudes to trains and railways.
 - Improved their knowledge and awareness of safety on railway property, including the dangers and consequences of games and / or inappropriate activities on / near the tracks.
 - Know how to be safe in railway environments and how to cross the tracks safely.

- The results suggest there may be a relationship between the place of residence and knowledge of railway safety. Specifically in the case of the pilot study, the schools that are located in closer proximity to the railway tracks have relatively less knowledge about railway safety than those located further away. One possible explanation for this could be that these children live in communities where it is socially accepted to take risks in railway environments therefore leading to a perception of railway trespassing as normal and thus greater confusion about how to act in the railway environment. Children are heavily influenced by the actions they observe in the adults around them which may lead them to reproduce the behaviour observed. Furthermore acting out high risk behaviour may be the children's response to an adaptation to their environment.
- The results indicate that the older students (Grade 4) have more knowledge regarding railway pedestrian safety. However, there is evidence that Grade 3 pupils improved their knowledge from before the workshop.

CBA for Railway Safety Education

For this measure, which is (as the one after) of an educational nature, we have made a first attempt of computing a CEA. Cost data are essentially design costs of teaching program, information dissemination costs, human costs (effort and time). Variables for evaluating measures effectiveness were twofold: (1) knowledge, awareness and attitudes related to risks inherent to railway trespass; (2) attitude of teachers and school staff related to delivering such preventative education. Results and assumptions are provided in **Table 1.1-22**.

Table 1.1-22 CEA of Pilot test 2 Railway safety education

Cost [C]	70 539€
Effectiveness measures (/year) [E]	
Children's attitude & knowledge changes between pre and post workshop survey (for all pilot school)	2,1% of 271 pupils (5,7 children changed towards correct behaviour after attending the training)
Participation of schools in delivering railway safety education before and after taking part in pilot measure	0% before, 75% after (6 schools)
Assumptions	The effect will remain stable at least during one year
CEA [E/C]	0, 0000806645 0, 0000850593

The results might appear somewhat disappointing but one should keep in mind that the current CEA might not accurately do justice to the measure efficiency, at least for the following line of reasons:

- Effectiveness might not be accurately measured regarding the current knowledge and attitudes of children towards rail safety and how these are impacted by the measures. On the one hand, the score of children during pre-test was quite high (97% correct answer), which can explain the weak increment (3%) to achieve a level of 99%, giving rise to a potential ceiling effect. The literature frequently refers to the existence of a deficit of knowledge by children regarding risk and safe behaviour in railway areas, however. Thus, either the children in the sample differ widely from the usual child population or either the

evaluation material is not sensitive enough. It is worth to note that such a high level was also observed for pilot test 3;

- Some other impact might not be accurately reflected as well. For example, if teachers and school staff are stimulated to implement preventative education related to railway risks and safe behaviour at schools, this will imply to lowering the need for educational intervention by railway staff in the schools;
- We are still missing some criterion to support the delimitation of the optimal scope for applying the measures are not available at this step. Different from the context of road safety where CBA are usually performed with the idea that measures should be applied on all situations for which they are designed across the whole country, the exact scope (in terms of space and population) of application has to be defined, as most of the measures won't be implemented in a systematic and uniform manner on the whole network areas. Identified hot spots or a certain fixed minimal distance between living areas and railways properties could be part of the criteria used to clarify the scope for application of the preventative measures

Subsequently, conclusions should not be drawn at the moment from this first attempt to compute CEA/CBA and further work is needed to address these issues. Moreover, we need to consider in the future a weighted formula to compute the CEA as well as the CBA taking into account the various impacts of the measure in terms of educational efficiency related to preventing trespass, as well as in terms of stimulating the willingness of teachers and school staff to deliver such educational actions. Furthermore, many assumptions should be clarified in the future about the potential impact of such educational measures on incidents and accidents; the size of the potential targeted population, how persistent is the effect, etc. In the same vein, it would be important to know the figures regarding the implication of children in trespassing accidents, and how these differ depending on where they are living relatively to the railway network location.

1.1.5 Applicability of results to different circumstances

The measure aimed to positively influence the behaviours and habits of children and young people towards acting safely around railways, preventive risky behaviour related to trespassing, thus reducing the possibility of trespassing accidents and incidents. These objectives are closely related to what has been termed as citizenship and social skills.

Social and civic competence is the ability to use knowledge about society, understood from different perspectives, to interpret phenomena and social problems in contexts and variable spatial scales, develop responses and decisions, as well as to interact with other people and groups according to social norms. The competence aims to help students develop the skills to identify problems in their environment, analyze and reflect on their personal experiences, obtain, interpret and evaluate relevant information, make decisions that ultimately enable the student to act with increasing responsibility and independence.

The importance of acquiring railway safety skills and the methodology used in the pilot makes its applicability in different social contexts possible. It is obviously necessary to adapt the contents to the reality of where the measure is being applied (national characteristics, cultural references, language, age,...). The selection of educational tools (workshops, posters, social media campaigns, etc..) and contents must take into account the demographic profile of the target population and the characteristics of the local implementation site.

When considering the applicability of the results of the Railway Safety Education Programme to other contexts, it is also important to take into account the fact that children reproduce the behaviours of the adults around them, a phenomenon common to all countries. If children observe

risky behaviours on a daily basis, these may be perceived as normal, acting as models for the children's future behaviour.

In this sense railway trespassing is a social problem which involves different actors and therefore requires a multi-dimensional and multi-stakeholder response. This emphasizes the essential role of the school and the society in providing the children with information about the real risks of this type of behaviour, regardless of national or cultural context.

Schools clearly have the potential to act as an effective delivery mechanism of railway safety. They offer a space and structure that promotes the sustainability and reach of the measure and the fact that schools exist in all countries, indicates the applicability of this measure in different cultural contexts.

It should be taken into account however, that depending on the country, there may be differences in the scope of a school's curriculum activities and their willingness to include railway safety within the school programme. Furthermore, there may be some sections of the population who do not regularly attend school (for example, traveller and gypsies) for whom the mainstream education system may not be the most effective communication channel.

In this sense, the application of the educational workshops may be considered in other learning contexts, including more informal situations, such as museums, youth groups and associations or in situ at railway installations.

In countries where railway safety education is undeveloped and there is limited awareness of its need, it is especially recommended to develop workshop materials that complement and add value to the school's learning objectives. By incorporating railway safety learning into the mainstream curriculum it encourages schools' participation in such an initiative and the inclusion of railway safety education within its activities.

The social actors with significant responsibility within a child's education are parents. A measure of this type, therefore, should consider being applied to this group. Educational workshops directed at parents could be delivered as a family learning activity at school or other learning spaces, such as museums or community centres. Whilst schools can be a good way to engage parents in learning activities, the degree of participation may depend on the school's approach to parental involvement and the relationship between the two parties.

The success of the participatory approach and age appropriate content used in both pupil and teacher workshop is evidence of the applicability of this type of methodology to all age groups, as it stimulates interest and active reflection on the subject.

In terms of applying the workshop to the adolescent age group, the communication channel may need to be reconsidered. Whereas the primary workshop used the Daniela character, the older age group would respond more effectively to the message being transmitted via other peers or media figures that are references for this age group. A good example of this is the Rail-life campaign in the UK. Rail-life is a website aimed at raising teenagers' awareness of the dangers of railway trespassing. The contents of the website include, amongst others, audio-visual resources with the campaign message often communicated by music artists, rappers and professional sports people, in addition to testimonials and campaign adverts by other young people.

Findings from both the pupils' and teachers' evaluation, suggest that the greater the exposure to railway tracks, the more willing people are to risk crossing. However, it is not possible to comment on its effectiveness when applied to contexts where there is no problem with trespassing or the population has limited contact with the railway environment, because no control group was conducted in the pilot. Despite this, it is likely that the result can be extended to other contexts and population groups, although the scope for impact is likely to be greater in contexts where there is a problem with railway trespassing, once people are informed of the real dangers and consequences of these actions.

1.1.6 Discussion

Evidence collected through the teacher and pupil evaluation exercises, together with anecdotal reports and the researchers' observations, demonstrate the effectiveness of the measure in terms of impacts on both pupils and teachers. In this way, the Railway Safety Education Programme will form a valuable part of the RESTRAIL toolbox.

On the one hand, the pupil workshop succeeded in generating knowledge about how to cross the tracks safely and stay safe in the railway environment, with the pupils expressing safe attitudes and awareness of the dangers of crossing the tracks on foot.

On the other hand, responses to the teachers' questionnaire point to the impact of the measure in raising awareness of the importance of teaching railway pedestrian safety and the dangers of trespassing at school, as well as a self reported increase in their confidence and skills to do so.

In the past there does not appear to have been a systematic school approach to dealing with the issue of railway safety or trespassing, despite the concern schools expressed and their first hand experience of the issue. Taking into account this baseline situation, the fact that the participating schools and individual teachers have reported their intention to continue delivering railway safety education in the future is further evidence of the effectiveness of the measure.

The results indicate a possible relationship between an awareness of the dangers of trespassing and the proximity of the school and/or place of residence to the railway tracks⁹. This may be due to the risky behaviour observed by the pupils on a daily basis leading to a perception of railway trespassing as normal and thus confusion about how to act in the railway environment.

Indeed findings from both the pupils' and teachers' evaluation suggest that the greater the exposure to railway tracks, the more willing people are to risk crossing. In such a context however, the scope for impact is greater, once people are informed of the real dangers and consequences of these actions. It is a clear indication of the impact of this measure therefore, that the participants' attitudes appear to have changed, with both pupils and teachers having reported an increased awareness of the dangers.

The findings of the pilot study suggest that children's knowledge of railway safety and their subsequent behaviour is heavily influenced by the actions they observe in the adults around them. Anecdotal evidence given by teachers and pupils indicate that parents and peers cross the tracks in unauthorized places thus establishing models of behaviour that the pupils may follow in the future. This emphasizes the essential role of the school in providing the pupils with information about the real risks of this type of behavior as well as the importance of parental involvement in the pupils' learning.

As observed by more than one of the teachers, people's awareness of the dangers of crossing the tracks may be heightened directly following an accident or incident, only to rapidly dissipate with the passing of time. These further highlights the need for schools to take a systematic approach to dealing with the issue of the dangers of railway trespassing with the aim of embedding a culture of railway safety, starting by addressing it within the school curriculum as has been successfully done with road pedestrian safety.

Incorporating the teachings within the school curriculum is a valuable approach for different reasons. It ensures continuity of the teachings and in a variety of learning contexts. It is also practical, in terms of the management of teachers' time, because rather than delivering a standalone activity which is additional to the curriculum, the subject will be dealt with in an integrated way, reducing the risk that the subject is left aside.

⁹ Based on the fact that the school located closest to the tracks scored comparatively lower in the evaluation results (i.e. less knowledge about the dangers of crossing the tracks) than the other schools.

This does not exclude the value of carrying out specific activities such as rail safety workshops, visits to the school by external practitioners or specialists or visits out of school, for example, to the railway museums or railway installations. Indeed one of the respondents expressed an opinion endorsing this approach, saying that the pupils often pay more attention when someone external delivers the activity.

Accidents and incidents caused by crossing the tracks in unauthorised places is a problem which transcends different areas of life affecting many different actors. In this way, it requires a sustained, coordinated and multidisciplinary response, led by experts. It is recommended that the stakeholders involved should comprise, as a minimum, the railway infrastructure manager, railway operator and public administration within the affected area, in addition to other groups affected by the problem (e.g. schools, community associations ...).

Education delivered outside of school, through organisations such as the Railway Museums or transport police, also plays an important role in communicating the safety message. One approach to reducing accidents and incidents on railway property could be to increase the society's understanding of railways and trains. In this sense the Railway Museums have a crucial role in bringing the society closer to the world of trains, being the institution that can mediate between railway companies and railway infrastructure managers, schools and the society as a whole.

As mentioned previously, given the scope of railway trespassing, it is important to tackle the issue from different angles, by working with the different groups affected. There is recognition amongst teachers of the benefit of working with the 8-10 year primary age group, in terms of future prevention and potential to shape attitudes, thus impacting their future behaviour. However, there is also a demand from the schools to work with the adolescent age group, as they are seen to be at greater risk of perpetrating this behaviour.

Materials and work methodology would need to be adapted, taking into account maturational effects and the nature of the problem being tackled with this age group. In this sense, the work with teenagers may be more intervention focused rather than purely prevention. For example, in the UK the British Transport Police carry out targeted interventions in secondary schools when young people have been identified trespassing on railway property. The hotspot is also then closely monitored.

One issue mentioned anecdotally by one of the teachers participating in the teacher workshop, is the concern that talking to pupils about railway trespassing may incite the very behaviour the measure seeks to prevent. Overall, recognition of the need to deal with the issue appears to outweigh this fear, although it is important to take this factor into account when planning such a measure and engaging the schools.

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