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Measurement modelling of the perceived service quality of a sightseeing bus service: An application of hierarchical confirmatory factor analysis

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ABSTRACT

Sightseeing buses were taken to use as main vehicles for students' excursions because of a large number of students participating in each trip. Schools should give significant importance to good quality sightseeing buses. This study aimed to develop the indicators monitoring and evaluating sightseeing bus services. This study examined the sightseeing tour buses' service quality factors according to 27 parameters applied as criteria for evaluating and improving service. Data were gathered from 3387 teachers and educational staff involved with educational field trips. The results of exploratory factor analysis (EFA) classified the parameters into three groups: vehicles, drivers and crews, and management factors. Subsequently, confirmatory factor analysis (CFA) was used to confirm the factor structure. The findings verified that the 27 parameters can indicate three perspectives of quality performance. CFA loading scores were quite high, implying that the parameters had strong potential usefulness for assessing sightseeing bus service quality. Likewise, the second-order CFA found that the three aforementioned latent variables are powerful indicators of tour service quality level at the 0.01 significance level. In this regard, the factor of vehicles exhibited the largest CFA loading (β=0.935). The results of this study potentially provide schools or entrepreneurs for the development of check list in assessing sightseeing bus quality which will make each trip more comfortable in travelling and safety.

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1. Introduction

Educational field trips are one way to enrich students' knowledge through learning from actual experience that complements what the students learn from textbooks (Bhuiyan et al., 2010). As Thailand has recently recognized the importance of this activity, excursions occurring once each academic year have been included as part of primary, secondary and vocational education curricula. These trips require schools to arrange large-group tours, which necessitate the use of sightseeing buses. As with other bus selection decisions, the school board always uses service quality information as a key criterion for choosing an educational tour bus. Therefore, bus companies must emphasize on constantly improving service quality. One common way to maintain and improve quality is to administer a service quality perception survey to users every six months or once a year. The data obtained can then provide guidance for the company's strategic decision making (Bordagaray et al., 2013; de Oña et al., 2013; dell'Olio et al., 2011; Wen et al., 2005).

Assessments of the level of sightseeing bus service quality require suitable indicators that are easily comprehended by respondents. If there are a large number of parameters, group classification is helpful in simplifying information for the organization to use in designing policies. Hence, the main purpose of this study is to develop parameters for the evaluation of sightseeing bus service quality, as well as to elucidate the significance of each parameter. To perform an effective quality assessment, as de Oña et al. (2013) stated, evaluators must discern which parameters have the greatest influence on the perceived quality. Exploratory and confirmatory factor analysis (EFA and CFA, respectively), which are statistical methods widely used for group categorization and parameter structure verification, can be applied in this case (for more details see Bruce (2010)). Such techniques are also part of structural equation modelling or SEM (Kline, 2011).

A review of existing literature shows that a number of previous studies have focussed prominently on service quality

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Table 1
Summary of previous studies.

Author(s)/year	Type of transportation/ country	Analysis method	Indicators of bus quality
Ratanavaraha and Jomnonkwao (2014)	Sightseeing buses/Thailand	Confirmatory factor analysis	Bus drivers in terms of age, experience, education, driving license, driving skill pertaining to the route, training, and no drinking or smoking.
Vetrivel Sezhian et al. (2014)	Urban buses/India	Discriminant analysis	Bus punctuality, seat comfort, cleanliness, lighting and entertainment, new fleet addition, seating for handicapped, seating for elderly, issue of proper ticket, in-time issue of ticket, issue of proper change, stopping bus at correct place, backup service during breakdown, provision for luggage, obey traffic rules, first aid facility, driver behavior, conductor behavior, and information to passengers.
Bordagaray et al. (2013)	Inter-urban buses/Spain	Ordered probit model	Waiting time, journey time, reliability, vehicle occupancy, driver kindness, comfort, price of the ticket, quality of the vehicle and available information.
Cafiso et al. (2013a)	Urban buses/Italy	Kendall's algorithm	Drivers (training, skills, performance evaluation and behavior), vehicles (maintenance and advanced devices) and roads (road and traffic safety issues).
Cafiso et al. (2013b)	Urban buses/Italy	Delphi method	Drivers (training, skills, performance evaluation and behavior), vehicles (maintenance and advanced devices) and roads (road and traffic safety issues).
de Oña et al. (2013)	Urban buses/Spain	Measurement model in structural equation modelling	Frequency, punctuality, speed, proximity, fare, cleanliness, space, temperature, information, safety, courtesy and accessibility.
Rojo et al. (2013)	Inter-urban buses/Spain	Ordered logit and probit models	Ticket price, duration of journey, delay, number of stops, state of the bus, bus facilities (air conditioned, wash room/WC, television), features of the bus station, ticket office features.
Rojo et al. (2012)	Inter-urban buses/Spain	Discrete choice models	Reason, duration, number of stop, O/D, cost, delay.
Rojo et al. (2011)	Inter-urban buses/Spain	Ordered logit and probit models	Ease of purchase (ticket), punctuality, information on bus times, frequency of service, state of upkeep (condition of the bus), cleanliness (bus), temperature (bus), seat comfort (bus), noise (bus), space between seats (bus), journey time, safety, number of stops, and relation quality–price
Susnienė (2012)	Urban buses/Lithuania	SERQUAL	Tangible, reliability, responsiveness, assurance, and empathy.
dell'Olio et al. (2011)	Urban buses/Spain	Multinomial discrete choice model	Waiting time at the bus stop, journey time on the bus, vehicle occupancy, cleanliness of the vehicle, driver's kindness and comfort of the buses.
González-Díaz and Montoro-Sánchez (2011)	Urban buses/Spain	Qualitative research	1. Quality of service outside the vehicle (e.g. safety of baggage, friendliness and diligence dealing with incidents and problems, ease of ticket purchase and friendliness at the point of sales, satisfactory facilities in stations, information on schedules). 2. Quality of vehicle (e.g. driver friendliness, appearance and level of training, exterior cleanliness and condition of vehicle, safety and smoothness of driving, information updates during trip, interior cleanliness and condition of vehicle, quality of on-board services, passive safety and vehicle comfort). 3. Fares and schedules.
dell'Olio et al. (2010)	Urban buses/Spain	Ordered probit model	Waiting time, journey time, access time walking to the initial bus stop, safety within the vehicle, comfort during starting and stopping, comfort during the journey, deviation from the optimal route, cleanliness of the vehicle, price of the bus ticket, quality of the vehicle, reliability of the vehicle, and the kindness of the bus driver.
Filipović et al. (2009)	Mass public transportation/ Serbia	Sample statistics (e.g. frequency)	Station comfort, vehicle comfort, tickets and pricing, information, accessibility in time, spatial accessibility, transport reliability, and staff.
Lin et al. (2008)	Intercity bus/Taiwan	Confirmatory factor analysis	Interaction with passengers, tangible service equipment, convenience of services, and operating management support.
Tyrinopoulos and Antoniou (2008)	Bus, trolley bus and rail (metro)/Greece	Factor analysis	1. General characteristics of the public transit system (service frequency, on-time performance, service provision hours, network coverage, general information provision, types of tickets and passes, prices of tickets and passes, tickets selling network, personnel behavior, existence of bus lanes, measures for environmentally friendly public transit). 2. Terminals and stops (walking distance to terminals and stops, information provision at terminals and stops, conditions at terminals and stops, safety at terminals and stops). 3. Vehicles (onboard conditions, vehicles cleanliness, driving behavior, onboard information provision, accessibility to disabled and mobility impaired people). 4. Transfer points (distance between transfer points, waiting time at transfer points, information provision at transfer points).
Tyrinopoulos and Aifadopoulou (2008)	Public Transport/Greece	Factor analysis and multinomial logistic regression	Safety, comfort, cleanliness, information and communication with the passengers, accessibility, terminals and stop points performance, lines performance, general elements of the public transport system, and compound indicators.

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